'Class-B'

6

App. F. IX—4

Previous References.

1957.
(PWD)

File No. PWD 68 BRP

Serial Nos.

Later References.

MYSORE GOVERNMENT SECRETARIAT

Serial

Public works Department
Major Irrigation—

Part B for

SUBJECT

B.R.P.- Inspection of Bhadra Reservoir Project by expert committee — plan projects—

WD 04703—GPB—1,00,000—18-12-58

May be presented for consideration
C.E. Lakshminarasaiah
13/12/85
W/S (Tech-II)
Irrigation.

Mysore Government Secretariat

[App. F. III 2

File No. PWD 18/57-4 .. 186 of 195 .

Serial No.

Letter from Sri. Indrajit Singh. Joint Secy. Finance & Secy: Committee on Plan Projects dated. 7/2/57.

Submitted for perusal. previous letter No: PC (CON) 123/56 dated. Sept. 20, 1956, referred in the letter has not been received here (as verified from the Labour Branch diary). Hence, it is for orders whether a copy of the letter may be obtained from the Planning Commission. Possibly it may be in the PWD.

(2) A copy of the letter ~~last~~ will if approved be sent to the Secy. to Govt. P.W.D. & Electrical Works & with a request to issue necessary instructions to the (1) Chief Engineer (General) (2) Chief Engineer, (Santa) (3) Chief Engineer (Electrical) in the matter.

3. When the final programme of their tour is received we may also approach G.A.D. to accommodate them in the Guest House.

14/2/57

14/2

4. Further action in this matter will be taken by the PWD.

Sec. PWD)

10/2

MYSORE GOVERNMENT SECRETARIAT NO. 310 16 FEB 1957 PUBLIC WORKS MAJOR IRRIGATION BRANCH

SECRETARY TO GOVERNMENT 264(a) Date 16/2/57 PUBLIC WORKS & ELEC. DEPTS.

DEPUTY SECRETARY TO GOVERNMENT No. 12 14 FEB 195 PLANNING DEPARTMENT

Note.—Contn. Sheet

2. Irrigation of Bhadra project — By expert committee of G.O.I. plans projects —

File No. PWD 68 BRP of 1957.

Mysore Government Secretariat

Serial No.

5) The letter of the planning Commission and its enclosure at pages 1-3 C F may be perused. The date of arrival of the team ~~has not yet~~ is not known. They may come at any time. In the mean time it is may that the C.E. N.S.S and the C.E for Electricity may be informed of the arrival of the team and keep ready all the information that is required by the team as per annexure. Opt is put up for ap.

18/2/57 18/2/57

6) For perusal before hand

Dy. Secy (PWD)

7) 19/2/57 Dy Secy (PWD).

KR 18/4/57

8) Issue urgently

KR 19.2.57

457(B)1 Date 20/2/57

Issued in No PWD 68 BRP 57 / 20.2.57.

To

The C E N S (S) B'lore

The C E.E - Bagalkot

The S.E T.B.V.C.

9) The file is re-submitted after issue ~~as per orders in the margin~~ for perusal of the planning Commission's letter (pages 1-3 C.F.)

Secy, P.W.D)

20/2/57 20/2/57

Mysore Government Secretariat

Inspection of Bhadra project - By cf Bert-3 Committee - plan projects.

File No. PWD 68 BRP of 1957.

[App. F. III 2

Serial No.

OFFICE OF THE MINISTER FOR PUBLIC WORKS No. F. 989 25 FEB 1957 BANGALORE

1206 13/3/57

10) For perusal & action taken
Mr. PW

11) 13/3

12) 13/3/57

13) 14/3/57

10 cf Received letter no 79179 dt 22-2-57 from the Chief Engineer Electricity forwarding a report of clarification in the matter

11 cf Received letter no 83/dt 26-2-57 from the S.E. T.B.V. circle stating that a comprehensive report has already been sent to the Chief Engineer

14) If approved the C.E. will be requested to forward the report of the above similar

18/3/57 18.3.

14/3/57

Issued No. PWD-68-BRP-57 dt 20/3/57

To The Chief Engineer,
Main Irrigation (South)
Bangalore.

Received letter No. CDPP(1) 5/57 dt 19th Feb 57 from the under Secy to Gov planning Commission New Delhi stating that

BRP – Inspection of Bhadra project by expert committee

File No. PWD 68 BRP of 1957. | Mysore Government Secretariat

Serial No.

That Sri R.S Barker has been appointed as secretary to the team and consultative committee for irrigation & power projects.

15) A copy of the same will be forwarded to CE n I(S) for information. Off put up.

25/3/57 25/3/57

16) Issue

25/3/57

Issued No. PWD 68 BRP, dated 25-3-57 to the Chief Engineer Irrigation South Bangalore

Received letter No 32 (1)/56 - Power dt 25th March 1957 from the Secretary to G.O.I. Ministry of Irrigation and Power forwards the Report on Services by the teams constituted by the Committee on plan projects. p. 29 C7.

17) orders of the Secy on the PWD. xxx put up. 29 C7.

R.K.S.
Dt 27-3-57.

B.S.S. 27-3-57.

18) The main file is put up as per orders. The terms of reference of the team for the study of Chambal and Lakkavalli (Bhadra) Irrigation projects have already been communicated to the CE n I S vide paras 5-8 of the notes. The G.O.I have now informed the names of

B Rp - Inspection of Bhadra Project by Expert Committee

Mysore Government Secretariat

File No. PWD 68 BRP 57. of 1957.

[App. F. III 2

Serial No.

The members of the team ~~for~~ constituted for the purpose ~~of~~ It approved a copy of the ~~letter~~ same will be forwarded to ~~both~~ the Chief Engineers (M.I. & South) ~~and North~~ for information and necessary action. Also also submitted.

29/3/57 29/3/57

For perusal before

29/3/57

19) 29/3/57

31/3/57

Issued. No. PWD - 68 BRP 57 & 2-4-57

To the chief Engineer, Major Irrigation (South) Bangalore.

Copy to Supt. Engineer, ~~Kanara~~ TVC for circle

20) This may be submitted to the Secy P.W. (Page 29 C.7.) for perusal w.r.t. para 17 of the notes after issue.

3/4/57 3/4/57

3/4/57

21) Refer letter of S.O. of Irrig. dated 25-3-57. For perusal

Mir. PW

4/4

Secy PW

22) 9/4

5 pm 10.4.57

OFFICE OF THE MINISTER FOR PUBLIC WORKS
No. F.30
5 - APR 1957
BANGALORE

6 · BRP - Inspection of Bhadra project by the Advyl Committee

File No. PWD & BRP/A of 1957.

Mysore Government Secretariat

Serial No.

Received letter No. 49/S dt 5.4.57 from the ~~Sec~~ Chief Engineer Major & Irrigation South, forwards particulars relating to the above subject for ~~being~~ furnishing to the members of the Consultative Committee. 34 CF

SECRETARY TO GOVERNMENT 403 Date 12/4/57

23) The C.E. has sent only limited copies. The copies now received will be sent to the members of the Consultative Committee. 1 CF

It appears necessary to send copies of the particulars to the members of the team also. So the C.E. will have to be asked to forward another 4 sets of the same. Hence a draft letter put up for approval. 29 CF

10/4/57

24) The Committee on plan projects have not called for these particulars. For orders if they should be furnished to them even before they request for the same.

10/4/57

25) For Pwd before issue

Dy. Secy (Secy Pwd)

26) 11/4/57

27) 15/4/57

16/4/57

Issued in no PWD BRP/57 dt 17-4-57

To

The members of the team and the Secy, Planning Commission.

BRP - Inspection of Bhadra project by the experts Committee - plan - projects

Mysore Government Secretariat

File No. PWD 68 BRP of 195).

[App. F. III 2

Serial No.

Letter no. PC/CoPP(6)/57 - 9.6.57 from Sri. V.T. Krishnamachari stating that the consultative Committee is not intended to be a superimposing authority on the local officers but on the other hand it is meant to ensure a two-way traffic in the acquisition of knowledge regarding techniques employed for execution of projects.

28) This is in reply to the Chief Minister's letter (Flag R)

29) for perusal

Min: PW

D. K. SRINIVASACHAR
Secy. P. W. & Elec. Depts.

30) 23/4

31) BRP 24/4/57

41 CF. Received letter No. CoPP/2 SP/3.5.57 dt 26.4.57 from the Secretary GOI and Power Team and Consultative Committee New Delhi. Requests another 4 sets of the particulars already sent.

32) We have already

SECRETARY TO GOVERNMENT 8 10 23/4/57 BANGALORE

OFFICE OF THE MINISTER FOR PUBLIC WORKS No. F.190 23 APR 1957 BANGALORE

3. BRP – Irrigation of Bhadra project – [illegible]

File No. [illegible] of 195[illegible]

Mysore Government Secretariat

Serial No.

called for 5 sets of the particulars from the chief Engineer for being sent to the remaining members. The Secy of the Committee has also now requested to send another 4 sets of particulars. The chief Engineer may be requested to expedite the same. A.D.O is put up for appl

[illegible] Secy
29/4/57. 29/4/57

For appl

[illegible] 30/4/57

Dy. Secy [illegible]

Approved
[illegible]
30/4/57

Issue
[illegible] 1/5/57

Issued No. [illegible] BRP/57 dt 3/5/57
To the C.E. M.I. (S)
Bangalore
By name.

Draft D.O. reminder to the C.E. M.I.(S) to put up for approval.

[illegible] Secy 25/5/57

Asst. to Chief Engineer.

Issue
[illegible] 27/5/57

Issued. No. [illegible] 68 BRP/57 dt 27/5/57
To The chief Engineer,
Major Irrigation (S)
Bangalore
By name

Bhadra Reservoir Project - Inspection of Bhadra Project by expert Committee.

PWD 68 BRP 57

45/CS.

Received letter No 50/S dt 30.5.57 from the C.E. M.I.(S).

46/CS.

Draft letter is put up for approval.

Dy. Ir. fair copy

31/5 31/5/57

Issued. No. PWD. 68 BRP 57 dt 6/57

To the Dy. C.E. M.I.(S) (By name)

Bangalore.

SECRETARY TO GOVERNMENT
Date 19.3.58
PUBLIC WORKS & REC. DEPTT.

MYSORE GOVERNMENT SECRETARIAT
NO. 57775
29 AUG 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

37 Placed below is a copy of the draft report on Lakkavali Project prepared by the Irrigation & Power Team of the Committee on Plan Projects constituted by the Planning Commission which was handed over to me to-day (19-8-57) in person by Shri M.Narasimhaiya, one of the Members. The following suggestions were also made:-

i) The Chief Engineer may be addressed to take into consideration the recommendations regarding the requirements of tunnel machinery;

ii) For the foreign exchange that might be necessary to buy that portion of the tunnel machinery equipment which cannot be secured in India, this Government may address Shri Gadgil, Leader of the Team;

iii) It is the opinion of the Team that additional ~~ag~~ grants that might be required by the Government of Mysore to step up the tempo of work so as to complete the Project by 1960-61 should be made available to the Government of Mysore. This Government may, therefore, address Shri Gadgil with a request to use his good Offices to secure the assistance of the Government of India for the additional finance necessary;

iv) If there is any point on which the help of the Government of India is needed, that may also be ~~addressed to~~ brought to the notice of Shri Gadgil to use his good Offices in our favour.

38 Action will be taken to obtain from the Chief Engineer, Major Irrigation (South) figures regarding the foreign exchange requirements and

Ref para. The stepped up programme for the II plan period and the ~~[illegible]~~ the ~~[illegible]~~ amount of foreign exchange involved for the tunnel works have been revised from the CE (I) and action is being taken separately. This file is re-submitted as per orders.

6/9/57.

We have to take urgent action on para 44 ante.

I have requested CE (MIS) to forward a few more copies of the stepped up programme as well as the requirements of F.E. for the execution of Bhadra tunnel, and he has promised to send the same with the course of the day. Pl. put up to file tomorrow.

12/9/57

Receipt D.O. No 142/S dt 12.9.57 from the Chief Engineer Major Irrigation South Bangalore.

51) ~~He has sent~~ The Chief Engineer has sent only two copies of stepped up programme for the current year and a copy of statement showing the minimum of foreign exchange required for tunnel works. He has not sent copies of the stepped up programme for the remaining years of the II nd plan period.

Ref para 50.

13/9/57.

52) The stepped up programme for Bhadra Project for the remaining period of the second plan period has been obtained and is do no enclosed.

Mysore Government Secretariat

336 pages File No. PWD (S. 114) of 195 [App. F. III 2

Serial No.

53) A draft D.O. letter to Sri. N.V. Gadgil to be issued under the signature of the M.(PWD), is put up for consideration. After the issue of the letter, further necessary action on the draft report will be taken in consultation with the CE (MH) and the Bhada Spl. committee, if necessary.

~~DY (PWD)~~

14/9/57

54) Put up typed draft as corrected

BSS 16.9.57

17.9.57

55) A typed draft is placed below.

17/9/57

~~DY (PWD)~~

Sey (PWD)

17.9.57

56) B.S. Srikantiah
17.9.57
Dy Secy (PWD)

Issued vide MPN. 789 & 26/9

Mr. PW

57) 196
D. K. SRINIVASACHAR
Secy. P. W. & Elec. Depts.

58) 27/9 27/9/57

27/9/57

Receipt D.O. No. 31 dt 13.9.57 from Sri Gadgil addressed to the MPW.

SECRETARY TO GOVERNMENT
Date 17.9.57
PUBLIC WORKS & ELEC. DEPTS.

THE MINISTER FOR PUBLIC WORKS
OFFICE OF
No. F. 20.45
SEP 1957
BANGALORE

CW M. enquire in the office of the M(PWD) whether the necessary details have been sent

(CF 505 S 1)

27/9/57

It is ascertained over phone from 53 CF the details were not sent & have the original details. We have let over to the [illegible]

Note.—Contn. Sheet

Yedra project - Suspension by the Govt - Draft report

File No. PWD 68 BRP 57 of 195 . 336/pages

Mysore Government Secretariat

Serial No.

59) D.O letter to Sri Gadgil under the signature of the P.W.D has been issued and the file re-submitted as per note of the Sec. P.W.D. on the letter at page 58 (F.N.) is forwarded herewith the C.E.N.D.(S) may be asked to furnish his comments if any w.r.t. the draft report placed below

27/9/57 60) A letter has been issued to Sri N.V. Gadgil on 26.9.57 over the signature of the Minister, P.W.D. (P. 51-52 C.F.) requesting to use his good offices for the release of foreign exchange for the purchase of machinery for tunnel works & for grant of central assistance for speeding up the work

27/9/57 61) For perusal; A copy of the draft report will be sent to CE(MH), with a request to forward his remarks on each of the points mentioned herein.

Dy. Secy.

28.9.57

62) Are the comments of the C.E. not already in the file. Pls verify

Boss 4/10/57

4/10/57

Bhadra project. Draft report —

Mysore Government Secretariat

File No. PWD 68 BRP of 1957.

[App. F. III 2

Serial No.

63) Comments of the C.E. in this behalf are not received, The same may have to be called for from the C.E. D.O.(S).

7/10 7/10/57

64) The draft report on the Lakkavalli project containing the views of the CE (MIS), as handed over to me in person, by the Dy. P.W.D. is found at pages 59–67 cyc, which may pl. be perused. This report, I believe might have been handed over to the Dy. PWD by the M. Nevertheless, officially, we have not called for a report from the CE (MIS) to forward his views on the draft report furnished by the team. pl. refer para 62 ante.

D.O letter No. 31 dt 9-9-57 from Sri Gadgil leader of the Team.

Read on 12/10/57 at 12 noon

12/10.

69 cf.

Dy. PWD

9.10.57

65 Pls get it officially

BRS 9.10.57

66) Pl. Address CE (MIS) minutely

9.10.57

67) A draft D.O is put up for signature

17/10.

CE

Pl. speak

18/10/57

68) A revised draft is put up

19/10/57 21/10/57

69)

9.10.57

Sanction in PWD P.D.O. 68 BRP/57 dt 26.10.57.

S. Polan

19/10/57

Note.—Contn. Sheet

Tra project. Draft Report

336 File No. PWD 68 BRP of 195

Mysore Government Secretariat

Serial No.

(70) A dft D.O. to Sri Bosker, Secy of the Team, forwarding copies of enclosures in put up for appl.

pl see page 3 cF.

27/10/57. 28/10/57

For appl.

28/10/57

29/10/57

30/10/57

1/11/57

Rempt

D.O letter No Copp / J&P. / 82-57 dt 18th Nov 1957 from the leader Irrigation & Power Team addressed to the Min PW.

p. 81 cF.

(74) Note of the Secy pro on the letter.

Handed over by Minister & putting up a draft letter in reply. t.t.t

B/s PW.

S.K.S. 21-11-57.

" B.S.S. 21-11-57.

(75) Pl put up with the connected file immediately

K.B.M. 21-11-57.

Bhadra project. Draft report.

PWD 68 BRP/57

(76) CE (N&S) has been addressed to forward his views on the report of the Lakkavalli project set up by the planning commission team. (61-68 N.F.) The report from him is awaited. Here, an interim draft reply to Sri N.V. Gadgil, is put up (to be issued under the signature of the Secy. (PWD)), for appl.

SECRETARY TO GOVERNMENT No. 7129 23 NOV 1957 PUBLIC WORKS & ELEC. DEPTT.

Secy PWD

22/11/57

(77) B.S. Srikantaiah 22.11.57 Dy Secy (PWD)

For. the final reply will have to go within 10 days. If req., CE should be called in for a discussion and a statement finalised. No matter should not be allowed to be dealt with merely by correspondence.

23/11

(78) Minr. PWD

D. K. SRINIVASACHAR
Secy. P. W. & Elec. Depts.

(79) 24/11

(80) 26/11/57

OFFICE OF THE MINISTER FOR PUBLIC WORKS No. F. 2770 NOV 1957 BANGALORE

(81) A D.O. letter has already been addressed to CE(N&S). Pl. remind him.

26/11/57

(82) A draft reminder is put up. It seems that the draft approved by the Minr has not yet been issued. However after issue, the file will be transferred to the Minister's office for issuing the letter. Draft put up may be approved.

Issue & put up today

26/11 27/11

(83)

Issued 27-11-57

(84)

Bhadra Project - Draft Report.

PWD 68 BRPM.

(85) Re-submitted after issue w.r.to para 83 ante.

28/11/57. 28/11/57.

Receipt instructions from U/S and hence written draft approved by Chairman & Secretary to be sent to Secretary for being sent to in confidence to send a reply to S.O.D.

28/11/57.

+ Receipt telegram dt 27th ~~Oct~~ NOV 1957 from the Secretary Commutative Committee Irrigation and Power projects & Team. New Delhi.

XP. 85 cF.

(86) A draft D.O. to CE Mg(S) and an interim reply to the Secretary of the Committee are put up for approval.

29/11/57. 29/11/57.

Issue today

29.11.57

(S)

(S) Issued

29/11/57

+ Receipt post copy of the Telegram in Confirmation

P93cF.

(89) Have the orders of the Secy for the Confirmation copy.

Accordingly a draft & fair telegram is put up for approval

29/11/57.

Issue & put up.

29.11.57

Bhadra project - Draft Report.

PWD 68 BRPS7

(91) Resubmitted after the D.K. Bifora

90 ante

29/11/57

MI 911

92) The draft of a letter addressed to the Leader of the Irrigation & Power Team forwarding the comments of this Government on the Report of the Team is put up for consideration.

MINISTER P.W.)

D. K. SRINIVASACHAR
Secy, P. W. & Elec. Dept.

3/12

OFFICE OF THE MINISTER FOR PUBLIC WORKS
No. F-2893
3 DEC 1957
BANGALORE

93

Letter Issued

A revised draft of the letter to the Leader of the Irrigation & Power Team is put up for consideration.

MINISTER FOR P.W.)

5/12

SECRETARY TO GOVERNMENT
No. 79.1059
5 DEC 1957
PUBLIC WORKS & ELEC. DEPTT.

(94)

5/12/57

5/12/57

(95) for orders whether any further action is necessary in view of the statements sent to the leader of the Team. Pl see page 114 ante.

Pl also see the marginal note of the

Bhadra Project. Draft report.

PWD 68 BRP 57

Secretary. P.W.D. near Paras Tank.

(96) No further action seems to be necessary at present.

6/12/57

6/12/57

Sri HVS

pl bring up

8/11/57

(97) As for instructions a dft D.O to Sri Borker, Secy of the Team, is put up for approval.

10/12/57 10/12/57

(98) Issue; This is in accordance with the existing practice very place today

10/11/57

Sri HVS

pl. put this notes sheet in the concerned file

10/11/57

(99) Issued 10/12/57

* Receipt D.O letter No CDPP/JKP 82/57 dt. 12.12.57 from the Secretary Commutative Committee Irrigation & power projects & Team. * P. 119 CF

(100) *** U/S n J BKS 16-10-57.

*** pl put up with the connected file indirectly. KBB. 16-12-57.

(101) For perusal of the letter at pages 119, 120 CF. It is submitted that we have already sent in view of the point in the form of a

Bhadra Project Draft report

PWD 68 BRPS

P. 114 CP

Statement accepting the recommendations of the Team in general. Subsequently a detailed note ~~[illegible]~~ indicating the present position and the reasons for the decision taken by the Chief Engineer (PWD) in respect of the alignment of the Right Bank channel across Shankhsagar valley has been sent by the PWD for P. 25 to the leader of the Team. (Please page 55 c/F of the linked file)

(102) Therefore, it appears not necessary to furnish a note as required by the Secretary of the Team as the State Govt agreed in general to all the recommendations except the alignment question. Further there are no matters which require further detailed examination. The Team is also aware of the financial position ~~[illegible]~~ in respect of the alignment. ~~[illegible]~~ The Secretary will be informed accordingly if approved. Off also submitted.

17/12/57 17/12/57

For perusal before Hon'ble

17/12/57

17/12/57

(103)

17/12/57

17/12/57

Bhadra project - Draft Report.

PWD 68 BRPS7

Receipt D.O No 112 dt 18.12.57 from the leader Plan projects Irrig & power — P. 131 C/F

G.O.I.

(104) Minutes of the Min for PW.

Say PW pl acknowledge receipt with thanks. Also gratitude for help rendered

HKV 26.12.57

XXX B.SS 30.12.57

(105)

A draft of the D.O letter is put up for sgnl

Sms 31.12.57 31/12/57

DC (PWD) M.(PWD)

(106) 31.12.57 B.S. Srikantaiah 2.1.58 Dy Sec (PWD)

3/1

6/1

Issues

N.M PW INA 6/1/58

6/1/58

OW pl. verify other w fair costs be despatched

6/1/58

OFFICE OF THE MINISTER ... F 330 ... 2 JAN ... BANGALORE

SECRETARIAT TO GOVERNMENT ... 4 JAN 1958 ... PUBLIC WORKS & ELEC. DEPT

Receipt letter No D.O 11-11 (13) 57 dt Feb 2 58 From the secretary to Govt of India New Delhi — 135 C/F

(109) For perusal of the letter at page 135 C/F D.O.No. printed Report on Lakkavalli project placed in the file. The CE PWD who is in charge of the project may represent

PWD (E) DEPTT

the committee proposed to be set up by G.O.I. However The CE M&S perhaps be consulted in the matter.

for orders.

25/2/58. 25/2/58 (II) D/S. may pl. see the letter of the G.O.I. at page 135 c.f. We may agree to the proposal of the G.O.I. to set up a Committee of technical experts to go into the question of the revision of 1945 agreement re: utilisation of the waters of Kaveri. As regards the nominee to represent our state, on the proposed committee, we may request the standing Committee of the chief engineers of the state, to suggest a name.

1.3.58
D/S PWD

D/S. PWD)

(III) Secy P. W. D.)

Dy Secy
4/3/58.

(IV) We may agree to the constitution of the Committee as proposed. Sri T.S. Murthy, CE M&I (N) may be nominated as our representative.

6/3/58

D/ME & PW)

(V) 7/3

D. K. SRINIVASACHAR
Secy. P. W. & Elec. Depts

7/3 8/3

SECRETARY TO GOVERNMENT
No. 19.221
4 MAR 1958
PUBLIC WORKS & ELEC. DEPTT.

OFFICE OF THE MINISTER FOR PUBLIC WORKS
No. 14054
7 MAR 1958
BANGALORE

SECRETARY TO GOVERNMENT
7 MAR 1958
PUBLIC WORKS & ELEC. DEPTT.

Ref para 112-114 ante

A draft letter to G.O.&J is put up.

9/3/58 Sms 3/10/58 pl. put up a typed draft as modified

KL 11/3

A Typed draft is put up

14/3

Dy. may also see before issue

KL 12/3/58

Dy

12/3/58

Issue

KL 14/3

NP 14.3.58

For format of the letter at page 139 cf. A dft letter

Proc [illegible]

forwarding a Copy of the agreement regarding Sharing of waters of Tungabhadra waters, is put up for ofpr

6/5/58. (123) For Revenue before [illegible]

6/5/58.

D/S)

6/5

(124) Issue.

SAM 7/5

Issued 9/5

7/5

Receipt [illegible] copies / [illegible]

Draft Report Sent to P & R for release & return. NO Report Received 20, [illegible] [illegible] K Kavali project

7.6. planning

(125) For formal. of page 163 & F.

[illegible] the Secy PW.

"Ack. receipt with thanks"

D.S.R. 27/5.

(126) A draft letter is put up for ofpr

[illegible] Issued 10/6 Issue as modified

7/6

One copy of the printed report on Hanskandi project received from the leader of the Team has been given to the chairman P.W.D Re-organisation Committee for reference. The P.W.D Dept have also requested us to spare a few copies of the same if available. The report is required for reference frequently. Therefore it is proposed to address the Secy of the Committee to send 12 copies of the report for reference in this Court. Dept feel that may be approved.

20/6/58

10/6/58. (129) For formal before Hon

13/6

Dfp)

Issue.

16/6

16/6

18/6/58

Issued
18/6

(13-) The letter at page 151 CF may be permed. A diff letter ~~at~~ acknowledging the receipt of cabin is put up for approl.

Pl also refer the U/S note vide flag A of the draft placed below which was sent to P.&O and now received back. What is stated in the note is true. Pl also refer paras 110 to 114 ante and page 135 CF.

27/6/58

27/6/58

Issue

30/6

Issued

2/7

3/3/87

7

File /Dy.No. PWD. 68/BRP(5) Sus No. C 17/BP 159

Date of issue.

Subject in brief. Utilisation of Bhadra Reservoir water
Report of the Irrigation and Power Team
on Lakkaoki project

Order	Reminder No.	Date	Remarks.

13

GOVERNMENT OF INDIA
Ministry of Irrigation and Power
.....

DW.II-11(13)57
New Delhi, February 1958.

From

Shri T.Sivasankar I.C.S.
Secretary to the Government of India.

To

The Secretary to the Government of Mysore,
Public Works Department, Bangalore.

MYSORE GOVERNMENT SECRETARIAT
No. 1543/r.,
20 FEB 1958
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Sub: Utilisation of the Bhadra river waters - Report of the Irrigation and Power Team on Lakkavalli Project (Mysore State).

.....

I am directed to invite your attention to the report of the Irrigation and Power Team on Lakkavalli Project and the concluding part of para 1-2(ii) of Chapter I on page 2 of the Printed Report in which the Irrigation and Power Team have stated inter-alia that both the Governments of Andhra Pradesh and Mysore State are agreeable to hold joint consultations with a view to the modification of a clause in the Inter-State Agreement of 1945 which hinders the Mysore State from maintaining a carry-over of balance water in surplus years to be utilised in lean years from the Lakkavalli Reservoir. The Team suggested that the Union Ministry for Irrigation and Power should provide the necessary machinery for reaching a final decision in the matter.

2. In pursuance of the above recommendation it has been suggested, if the Mysore Government have no objection, that a Committee of technical experts comprising Shri Kanwar Sain Chairman, C.W.&P.C. as Chairman and two members, one representing the Government of Andhra Pradesh and the other the Government of Mysore State should be set up to go into the matter and make recommendations to the State Governments. I am to request that the State Government may kindly accord their approval to the suggestion and intimate to this Ministry the name of their nominee to represent the State on the proposed Committee. The venue, date and time for the first meeting of the Committee will be intimated to the States in due course.

3. This may please be treated as urgent.

Yours faithfully

(T.Sivasankar)

PWD 68 BRP 57
01-14.3.58

To

The Secretary to Govt. of India,
Ministry of Irrigation & Power,
NEW DELHI.

Sir,

Sub: Utilisation of the Bhadra River waters - Report of the irrgn. and power Team on Lakkavalli Project (Mysore state).

Ref: Your letter No.D.W.II-(13)57 dated Feb.1958.

====

With reference to the communication cited regarding the above subject, I am directed to intimate the approval of this Govt. to ~~be~~ The constitution of the proposed Committee to consider the necessary modification of the Inter-State Agreement of 1945. Sri T.S.Murthy, C.E.M.I.(N) Munirabad, is nominated as the representative of this State, on the proposed Committee.

Yours faithfully,

12.3.58

Secy. to Govt. P.W.D.

Issued
14.3.58

Copy of the above with a copy of the letter No.D.W.11-11(13)57 dated Feb. 58 of the Govt. of India forwarded to:

The C.E.MIN Munirabad.
The C.E.MIS Bangalore, for information.

Issued
14.3.58

12/3/58

12.3.58
For Sec'y to Govt. PWD.

MYSORE GOVERNMENT SECRETARIAT
NO. 3963
- 3 MAY 1958
PUBLIC WORKS MAJOR IRRIGATION BRANCH

No.DW.II-11(13)/57
Government of India
Ministry of Irrigation and Power
::::::

MYSORE GOVERNMENT SECRETARIAT
NO.
2 MAY 1958
PUBLIC WORKS BRANCH

From

Shri H.N. Das Mohapatra,
Under Secretary to the Government of India.

To

The Secretary to the Government of Mysore,
Public Works Department,
Bangalore.

SECRETARIAT
2 MAY 1958
PUBLIC WORKS DEPTT.

New Delhi, the 29th April, 1958.

Subject:- Utilisation of the Bhadra River Waters - Report of the Irrigation and Power Team on Lakkavalli Project (Mysore State).

-.-.-.-

Sir,

I am directed to refer to your letter No.PWD.68.PRT.57 dated the 14th March, 1958 on the subject cited above and to request that a copy of the Inter-State Agreement of 1945 may kindly be forwarded to this Ministry immediately, as the same is not available here.

Yours faithfully,

(H.N. Das Mohapatra)
Under Secretary to the Government of India.

PWD. 68 BRP57

141

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(Continuation sheet draft form).

Sub:- Utilisation of Bhadra River waters - Report of the Irrigation and Power Team on Lakkavalli project (Mysore State)

~~Gov~~ To

The Secretary to Govt of India
Ministry of Irrig & Power New Delhi

Sir,

Ref: Your letter No. BW 11-11(B3)/57 dt 29-4-58.

As ~~requested~~ desired in your ~~letter reference~~ to the Consideration cited ~~matter~~ above, ~~subject~~ I am directed to enclose a copy of the Agreement of 1945, between the representatives of the Govts of Madras & Mysore in regard to the Sharing of the

WD-05448-GPB—PZS—50,000-27-9-56

Walawa of the Tungabhadra, as stated.

for an execution and

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U/S I: Cont
pro

6/5/58

M.C.
6/5/58

Issued
9/5

P.W.D. Th.

No. COPP/(4)/2/58
Government of India
Planning Commission
Committee On Plan Projects

Krishi Bhawan,
Queen Victoria Road
New Delhi-2

Dated the 17th May, 1958
Vaisakha ,1880(Saka)

From

Shri S.D. Manaktala,
Under Secretary to the Govt. of India

To

Chief Secretaries of all State Governments
(Except Madhya Pradesh and Rajasthan) and
Administrations.

Subject: Investigations into Irrigation & Power Projects by the Committee on Plan Projects.

****

Sir,

I am directed to refer to this office letter No.COPP(4)/22/57 dated 28th May 1957 forwarding a copy of the Memorandum from the Committee on Plan Projects to the Leader of the Team for Irrigation and Power Projects, and to forward herewith a copy of the Team's Report on Chambal Project.

2. A copy of the Team's Report on Lakkavali Project was sent to the State Government/Administration under this office letter No. COPP(4)/37/57, dated January 17, 1958.

Yours faithfully,

(S.D. Manaktala)
Under Secretary to the Govt. of India.

Copy, with a copy of the Report referred to in para 1 above, forwarded to all Union Ministries(except Ministry of Irrigation & Power) in continuation of Committee on Plan Projects endorsements No. COPP(4)/22/57 dated May 28, 1957 and No. COPP(4)/37/57 dated January 17, 1957.

This was be transferred to MIS.(Pro B)

(S.D. Manaktala)
Under Secretary to the Govt. of India.

RDV

PWD 68 BRM 57

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

Sub: Investigations into Irrigation & power projects by the Committee on Plan projects —

To

The Secretary to Govt.
Planning Commn.
: Committee on Plan projects.
New Delhi

Sir,

Ref: your letter no Comm/(4)/2/58 dt 17th May 1958

I am directed to acknowledge with thanks the receipt of the copy of the Team's report on Chambal projects above-sent with your letter cited.

~~I am also to request you kindly to arrange to send~~

WD 0258—GPB—PZS-1,20,000—1-7-55.

~~Six more copies of the printed~~ report on Kakkadoli project for ~~reference of in the Govt~~ the use of the Govt.)

A separate letter may be addressed to his

7/6

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7/6/88

U/S Aug

4/6/88

mcl 4/6/88

Issued

10/6

GOVERNMENT OF MYSORE

No. PWD 68 BRP 57

Mysore Government Secretariat,
VIDHANA SOUDHA,

Dated, Bangalore,... 10th June 195 .

FROM

Secretary to the Government of Mysore,
Public Works Department, Bangalore.

To

The Secretary to Government of India,
Planning Commission,
Committee on Plan Projects,
NEW DELHI.

Sir,

Sub:-Investigations into Irrigation and Power Projects by the Committee on Plan Projects-

Ref:-Your letter No.COPP/(4)/2/58 dated 17th May 1958.

I am directed to acknowledge with thanks the receipt of the copy of the Team's report on Chambal Project sent with your letter cited above.

Yours faithfully,

10.6.58

(K.B.Murarappa),
Under Secretary to Government,
Public Works Department.

PK:9-6/2.

PWD 18 BRP57

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

P. 131 e F

Subj: Hakkivalu Report.

Dear Sir,

Kindly refer to Sri N. V. Gadgil's letter of 18th Dec 1957 addressed to the Minister for Irrigation, Govt of Mysore regarding the above subject. I am desired to request you kindly to arrange to send 12 (Twelve) more copies of the printed report on Hakkivalu project for reference in this Govt.

Yours

To

Sri D. S. Borker,

Secretary Consultative Committee

Irrigation & power

Projects & Team

Multi Storied Building (5th floor wing)

Queen Victoria Road

New Delhi. 2.

WD 0258—GPB—PZS-1,20,000—1-7-55.

20/6/58

10/6/58

Issued 18/6

D.S.Borker
Secretary, Consultative Committee,
Irrigation & Power Projects.

MYSORE GOVERNMENT SECRETARIAT
NO. 5564
27 JUN 1958
PUBLIC WORKS MAJOR IRRIGATION BRANCH

No.COPP/I&P/110/57/ 2677
Krishi Bhawan,
Queen Victoria Road,
New Delhi.

Dated the 21st June, 1958.

Dear Murarappa

Please refer your D.O.No.P.W.D.68 BRP 57 dated the 17th June,

12 copies of the Lakkavalli Report are sent herewith.

Yours Sincerely,

(D.S.Borker)

Tel: 45741
43733

Shri K.B.Murarappa, B.E.,
Under Secretary to Government,
Public Works Department,
Vidhan Soudha,
Bangalore.

Enc: 12.

One copy received by me

COPP/IP/1957/1

REPORT OF THE IRRIGATION & POWER TEAM

ON

LAKKAVALLI PROJECT

(MYSORE STATE)

COMMITTEE ON PLAN PROJECTS
NEW DELHI

NOVEMBER 1957.

COPP/IP/1957/1

GOVERNMENT OF INDIA

COMMITTEE ON PLAN PROJECTS

(IRRIGATION & POWER TEAM)

सत्यमेव जयते

REPORT

ON

LAKKAVALLI PROJECT

MYSORE STATE

NOVEMBER 1957

57 P.C.—1.

LETTER OF TRANSMITTAL

New Delhi, the 16th November 1957

My dear Shree Pantji,

I have great pleasure in forwarding to you the Report of the Team for Irrigation and Power on Lakkavalli Project. The Report is the result of close study on all relevant facts and observation of necessary matters. The method followed was to consult the Project Authorities concerned at every step, the dominant thought being to do everything in close co-operation and in spirit of joint endeavour.

2. As the work of the Team proceeded, interim reports were submitted from time to time and thus no time was allowed to be wasted for such recommendations being implemented as were agreed and approved. The Report has the concurrence of the Consultative Committee which was appointed to advise on the technical questions. The Mysore Government and the Ministry of Irrigation and Power with whom the Report has been discussed are in general agreement with the conclusions and recommendations of the Team. For facility of implementation, the main recommendations of the Team have been placed as an appendix in the form of a tabular statement in accordance with the memorandum No. COPP/7/1/5/57 dated the 7th February, 1957 of the Committee on Plan Projects to the Leader of the Irrigation and Power Team.

3. I take this opportunity of thanking you for the close personal interest you have taken in the investigation as also the Secretary of the Committee on Plan Projects. The members of the Consultative Committee were extremely helpful and the guidance they gave to the members of the Team was constructive and far-sighted.

Yours sincerely,

N. V. GADGIL.

Shri Govind Ballabh Pant,
Minister for Home Affairs,
New Delhi.

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INTRODUCTORY

The National Development Council constituted in September 1956 the Committee on Plan Projects with the Minister for Home Affairs as Chairman with a view to securing economy and efficiency in the utilization of financial and other scarce resources in the implementation of Projects included in the Second Five Year Plan. The Committee on Plan Projects better known as COPP set up the Irrigation and Power Team to conduct investigations on the Lakkavalli and Chambal Projects. The composition of the Team was as follows:

Shri N. V. Gadgil.	Leader.
Shri Lal Singh, *Ex*-M.P., Director of Agriculture (Retd.), Punjab. Shri M. Narasimhaiya, Chief Engineer for Irrigation (Retd.), Mysore. Shri C. L. Handa, I.S.E., formerly Director Bhakra Dam Designs Directorate, Punjab.	Members for the Chambal Project.
Shri G. N. Pandit, I.S.E., formerly Superintending Engineer, Bombay.	Member for Lakkavalli Project.

The Team was guided by a Consultative Committee consisting of senior engineers:—

Shri A. N. Khosla, Vice-Chancellor, Roorkee University.

Shri N. N. Iengar, Adviser, Ministry of Iron and Steel.

Shri M. S. Thirumale Iyengar, Chief Engineer, Hirakud.

Shri R. K. Gupta, Managing Director, National Projects Construction Corporation.

Shri D. S. Borker worked as Secretary to the Consultative Committee as also to the Irrigation and Power Team.

2. The Irrigation & Power Team was required to make a study of various aspects of the two Projects with special reference to:—

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to:—

(a) Utilisation of trained personnel and materials;

(b) Utilisation of machinery and equipment;

(c) Construction—Plant lay-out;

(d) Adequacy of original estimates and designs as evidenced from actual construction of the Project;

(e) Phasing of construction with a view to studying whether:

(i) Timely utilisation of benefits accruing from the Project has been ensured;

(ii) it is possible to accelerate accrual of benefits;.

(iii) benefits could be increased by rephasing the Project at this stage;

(f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

(g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the Project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the Team may like to make in order to ensure economy and efficiency in the construction of the Project.

3. The main burden of the investigation on irrigation side of Lakkavalli Project fell on Shri G. N. Pandit who was specially selected for this work. Shri N. N. Iengar, Electrical Adviser, Ministry of Iron & Steel, and a Member of the Consultative Committee on Irrigation & Power dealt with power aspects of the Project. Both of them visited the Project site a number of times for observation and collection of relevant data. It was followed by a visit by the Leader and Members of the Consultative Committee who held discussions with the Chief Engineer (Irrigation) and other officials of the Mysore Government. The tentative conclusions of the Team were formulated in May 1957 and the draft report was placed before the Consultative Committee towards the last week of August 1957. The report as modified was forwarded to the Mysore Government who were in general agreement with the recommendations made by the Team.

4. We take this opportunity to record our gratitude to Mysore Government for the facilities extended for the conduct of investigations and spirit of accommodation shown by the Chief Engineers, Irrigation and Electricity and other officials. We are specially indebted to Shri Indarjit Singh, Secretary, COPP, who took active part in the deliberations of the Team and gave generously his time and knowledge especially on financial and administrative aspects of the Report.

1. SCOPE OF THE PROJECT

1.1. The dependable annual yield is 1,00,000 mcft. at the dam site, range of variation being 75,000 mcft.—1,50,000 mcft. The utilisation for irrigation and power put together is 90 per cent of this yield. All possible expedients have been exploited in order to maximise generating capacity of the project, e.g.:

(a) The Project is designed to generate power from discharges released into the river bed and also from the discharges released into the Right Bank and Left Bank Channels. The total installed capacity is 40,400 KW.

(b) It is also planned to utilise water released for irrigation to the maximum extent, by reusing for additional irrigation, the water re-generated into nallas from the irrigated tract. This is proposed to be achieved by constructing pick-up weirs across them. The total area irrigated would be 2,34,000 acres.

1.2. There is a possibility of generating more power by slight modifications in the design and in the arrangements under which it has been planned in the manner indicated below:—

(i) During good years surplus water is available. Besides, in the initial years, irrigation will not have developed fully and a proportion of the water earmarked for irrigation can be utilised for generation of additional power and energy by discharging this surplus into the river bed. It is suggested that during negotiations with the successful tenderers for the supply of machinery, maximum overload capacity for all the generating units be called for and incorporated in the final designs of the units. About 6,000 KW. overload capacity may be feasible.

(ii) The fullest use of the supplies in the Lakkavalli storage for power can, however, only be secured if the regulation of water permits certain balances to be left over in the reservoir in good years to be utilised in subsequent lean years, thus increasing the level of firm energy generated annually. The utilisation of the waters of the Bhadra river is subject to an understanding which was arrived at in December, 1945, through the good offices of the Government of India, among the then Mysore, Madras and Hyderabad States. The two

States now concerned are Andhra and Mysore. According to Clause (2) of this agreement (*vide* app. II), out of the quantity of water impounded in the reservoir every year, 57,000 mcft. only could be utilised for irrigation on this Project and the balance should be released into the river undiminished within the same year. By implication, it appears that the said Clause operates to prevent Mysore State from maintaining a carry over in surplus years. The design of the Dam has been so prepared as to permit carry over to be maintained. The carry over, while beneficial to Mysore, need not affect adversely the Projects downstream. This is, however, a matter which requires joint consultations and the Team is glad to report that both Governments are agreeable to further discussions. It is suggested that the Irrigation and Power Ministry may provide the machinery for reaching final decisions.

2. ADMINISTRATION

2.1. The distinctive features of the administration of the Project are as follows:—

(a) The ratio of the cost of establishment to the total cost of the Project works out at 4% which is considerably lower than the 10-12% ratio considered as desirable by the Nangal Seminar of Engineers. This may be mostly attributed to the lower scales of pay prevalent in the Mysore State as compared to other States, and partly it is due to certain under-staffing of the Project to which a reference will be made later.

(b) The management of the Project is carried out with the assistance of a Consultative Committee of Engineers, a High-powered Committee of Administrators and Engineers and the Chief Engineer, Major Irrigation (South) who is also in-charge of the Sharavati Valley Hydro Electric Scheme and some other Projects of the State.

2.2. The unique feature of these arrangements is the constitution of a Consultative Committee consisting of the two Chief Engineers of the State, six retired Chief Engineers of the State, retired Director of Hydraulic Research, Chief Engineer, Electricity Department, Secretary to the Government in the P.W.D. and the Under Secretary to Government, P.W.D., who acts as Secretary of the Committee. The technical decisions of the Committee are taken at a preliminary meeting under the chairmanship of the Chief Engineer concerned. The draft resolutions of this preliminary meeting are then ratified by the regular meeting of the Standing Technical Advisory Committee presided over by the Minister, P.W.D. According to convention the decisions of the Standing Technical Advisory Committee are invariably accepted although functionally the Committee has only the right to advise.

2.3. The administrative details connected with these decisions are then considered fully by a High-powered Committee of which Minister, P.W.D. is the Chairman. The Secretaries to Government in the Public Works, Finance and Development Departments, President, Stores Purchase Committee, two Chief Engineers and Shri M. Narasimhaiya act as members. The resolutions passed by this High-powered Committee constitute an authority for implementation. The effect of consideration given by this Committee is that routine departmental procedures are cut across at origin,

and a sense of expedition is introduced into the implementation of the Project. The High-powered Committee is virtually the Control Board for the Project.

2.4. The actual administration of the Project is with the Chief Engineer, Major Irrigation (South). The detailed working of the Project is supervised by a Superintending Engineer.

2.5. The three-tier arrangement above ensures that practical and administrative issues are given due consideration by persons qualified to undertake such responsibility. The arrangements may look, on the face of it, somewhat complicated but in actual operation they have considerable advantages over arrangements made for the execution of Projects in other States. The distinctive feature is the manner in which the available engineering talent in the State has been harnessed for the discussion of technical issues arising from the Project. The responsibility for details of designs and technical execution is thus shared between the existing Chief Engineers and the other engineering talent in the State. This enhances the confidence of the administrative agencies in the final designs and plans for execution which, in turn, enables expeditious implementation. Ad hoc consultations are decided upon by designing and executing authorities elsewhere as difficulties arise, but there is no continuous technical scrutiny by persons not burdened with the daily routine of designing and administration involved in the execution of the Projects. This feature of the Lakkavalli Project is worth copying and certain proposals, in this behalf, have been made by the Team in its report relating to the Chambal Project.

2.6. A reference has already been made to some under-staffing in the Project. The following suggestions are being made for strengthening its administration. They have been generally discussed with the Project authorities of the State Government, and are acceptable to them. The justification for each proposal is briefly indicated below. The Team has been constrained to suggest additional expenditure in the interest of more effective execution of the Project, as follows:—

(i) The work on the Tunga Anicut Project is nearly completed, but the tempo of the progress on the Lakkavalli Project needs to be intensified immediately. The large and important works of the 2¾ miles long tunnel on the Right Bank Channel, and the excavation of the Malebennur and Davangere Branches are to be started immediately and proceeded with at a rapid pace so as to synchronize with the completion of the Lakkavalli Dam. These works are situated at a distance from the site of the Lakkavalli Dam. The construction of the dam is reaching a stage when the construction of the power houses, installation of the turbines and the generating units, installation of sluice gates and crest gates, etc.,

will have to be undertaken according to schedule. These works will need considerable personal attention of the present Superintending Engineer. It is necessary that an additional post of Superintending Engineer should be created to take charge of the construction of the channel tunnel and the Malebennur and Davangere Branches. The total annual expenditure on this Project, hereafter, of 4-4½ crores of rupees is sufficiently heavy to justify the creation of a second Circle. A good deal of preliminary work has to be done in connection with the construction of the tunnel and the actual construction will need constant attention at a sufficiently high level. It is also desirable, in the interest of the timely completion of this work which has already been delayed, that the headquarters of the second Superintending Engineer should be fixed within an easy reach of the tunnel. It is understood, as a result of informal discussion with the representatives of the Mysore Government, that they accept the justification for the creation of an additional post of a Superintending Engineer.

(ii) The arrangements for preparing designs need revision. The present practice is that both major and minor designs are prepared in the offices of the Executive Engineers and approved by the Chief Engineer. The latter has no central Designs Office. Since major Projects other than Lakkavalli are also being taken up for execution and it has been found, in actual practice, that major changes have to be made in designs, it is suggested that a Central Designs Office may be constituted under the Chief Engineers. This office should attend to major changes in design. There will also be day to day supervision of the evolution of designs by the Chief Engineer on whom ultimately rests the responsibility of approving them and for placing them before the Consultative Committee. It will also be possible for type designs to be standardised for other works. The minor designs may continue to be prepared by the Executive Engineers. It will also be necessary to locate a small designs cell of the Central Designs Office at the headquarters of the Superintending Engineer in order to maintain liaison with field officers and to render such local assistance as may be necessary to the Executive Engineers engaged on minor designs. The exact staff requirements for the designs organisations suggested above would require to be worked out in detail.

(iii) The designs of the spillway and the stilling basin and certain other features of the dam were based upon the results of several hydraulic experiments carried out at the Research

Station at Krishnarajasagar. This station is under the administrative control of the Chief Engineer, General. The current procedure is that the estimate for the cost of conducting the model experiment has to be approved by the Chief Engineer, General. Also, the results of the tests are communicated by the Director, Research Station to the Chief Engineer, General, who transmits them to the Special Chief Engineer incharge of the Project. This procedure is lengthy as an unnecessary stage in the form of Chief Engineer, General, as the Controlling Officer is introduced in the transmission of papers. As the cost of the model studies is met with from the Project funds, the sanction to the estimates should be accorded by the Project authorities, under whose control and guidance the Research Officers could maintain close contact with the Project Engineers, readily visit the site of the work if necessary and promptly communicate the results of the tests to the Project authorities.

(iv) The present laboratory facilities for the field research work and tests on this Project are not adequate. This is particularly necessary as the work is being mostly executed departmentally. The quality of work and strict observation of specifications have to be continuously watched and ensured. The Team would suggest that a separate organisation headed by an experienced senior Executive Engineer, directly responsible to the Chief Engineer, should be created for the purposes of inspection. This organisation should also be incharge of laboratory tests and should advise on variations required in the designs and techniques of concrete, mortars and earth-works, etc. The organisation will need a moderate staffing but its ultimate benefit would be well worth the expenditure incurred as is clear from the functioning of such organisations elsewhere.

(v) There has been some difficulty in obtaining experienced store-keepers. When the work on the construction of the tunnel is undertaken, the responsibility for store-keeping will increase. The Team suggests that the Mysore Government, either itself or with the assistance of a Commerce College conduct a short course for training Store-keepers and Clerks.

3. PHASING OF CONSTRUCTION PROGRAMME

3.1. In a multipurpose or irrigation Project it is to an economic advantage if the construction programme is so arranged that benefits start accruing even before the Project is fully completed.

3.2. In the Lakkavalli Project the construction programme is such that a progressive accrual of irrigation benefits is secured (appendix—III):

(a) The sluice of the Left Bank Channel is at+36 above river bed. The dam was raised above this level in 1955-56. Simultaneously the Left Bank Channel was completed and opened for irrigation (18,500 acres).

(b) The sluices of the Right Bank Channel are located at R.L. + 100. The Right Bank Channel is divided into the following three Sections:—

Section I. Mile 0—48:—

Culturable command on main canal, 39,500 acres. Culturable command on Anavery Branch Ex-R.B. main canal 11,000 acres.

Section II. 2¾ miles:—

Tunnel with its approaches.

No irrigation.

Section III. Main Canal from mile 51 to tail and Davangere and Malebennur Branches:—

Culturable commanded areas:

Malebennur Branch	60,000 acres
Davangere Branch	95,000 „
Harpanhalli Branch	10,000 „

3.3. The dam in the spillway section is proposed to be raised to a level+98 in the year 1958-59. This is just a few feet short of the cill level of the Right Bank Channel sluice. The phasing of the construction programme can be improved so as to obtain additional irrigation benefits one year earlier. The dam is to be raised to about + 106 with a smaller but stable cross section (masonry in flanks to be raised correspondingly in a similar manner). The works in Section I of the Right Bank Channel together with the Anvery Branch are to be completed simultaneously. Such a programme is practicable in view of the fact that additional

quantities of work involved are small (appendix—IV). The work on the construction of the main canal in Section I is already well advanced. There is one railway crossing in this Section which must be constructed in time. With the implementation of these suggestions irrigation facilities to an area of 50,500 acres will become available one year earlier without any extra cost. In the context of the present food situation, the Irrigation Development Committee will, no doubt, when apprised of the earlier introduction of irrigation on the Right Bank Channel, take all the necessary steps to ensure that lands are in readiness to receive the benefits.

3.4. The construction of the tunnel in Section II and the finalisation of the alignment of the Right Bank Channel and the Davangere and Malebennur Branches near the Sulekere tank are the two pre-requisites for the functioning of last and the most important reach of the Canal. The urgency of an early resolution of these problems is now recognised.

3.5. The actual construction of the tunnel should not take more than two years (including six months for procurement of machinery). Hence if energetic steps are taken from now, the tunnel should be ready by middle of 1959. By this time a major portion of the Malebennur Branch and some portion of the Davangere Branch should be completed. The canal work should be completed in all respects by 1960-61, which is also the year when the dam will be completed and full storage made available.

3.6. In view of the fact that there are definite prospects on this Project for the commencement of irrigation and power benefits without a time lag, the full quota of funds for the completion of the balance of the job needs to be made available.

4. FEATURES OF DESIGNS AND CONSTRUCTION

4.1. The design of the masonry dam follows modern practice in respect of assumptions for uplift, provision for consolidation and curtain grouting, drainage gallery, effective arrangement for dissipation of energy of the spillway discharge based on hydraulic model experiment etc.

4.2. In respect of the earth dams in the saddles, the design is based on the modern concepts of soil mechanics. This work, however, remains to be done and arrangements for field quality control need to be established as suggested.

4.3. It is desirable to install instruments in the masonry and the earth dams for collecting data on their behaviour. The information sought for the masonry dams, would be on temperatures, deflection, uplifts and stresses; and for the earth dams, it will be on consolidation settlement and pore pressures. Such instruments could be installed at a small cost and their observation entrusted to the maintenance staff.

4.4. It has been an established practice in the Mysore State to use mortar of lime and surkhi (1:4) for constructing masonry. This mortar develops fair strength and produces water-tight masonry. The specifications for this mortar were originally evolved on the Vanivilas-sagar Dam in 1892 and were later adopted on the construction of the Krishnarajasagar and other dams.

4.5. The masonry with the lime-surkhi mortar is found water-tight and economical. In spite of the comparatively heavy cost of stone at Lakkavalli as Rs. 50—60 per 100 cft., due to long leads, the average cost of rubble masonry for the hearting of the dam is not exceeding Rs. 1·25 per cft. exclusive of overhead charges (*vide* App. V). Test holes drilled in the body of the dam could take only an insignificant amount of grout, showing the excellence of the masonry.

4.6. There is no laboratory control on the raw materials used for the manufacture of lime and surkhi during the stage of construction. Results of tests of the mortar cubes performed, continuously, show a wide variation of strengths (*vide* App. VI). If lime kankar and soils used in the manufacture of mortar are subjected to tests it would be possible to standardize the product and reduce the variations of the mortar strengths to narrower limits. Such standardization will lead to the adoption of higher permissible stresses in the masonry and permit adoption of more economical cross sections of dams. Therefore, it is suggested in para 2.6 (iv) to provide a suitable organisation to control this very

important aspect. This organisation provided with a well equipped laboratory should also be able to design the concrete mixes in accordance with modern scientific methods, so as to obtain mixes of required workability and strength with the least possible amount of cement.

4.7. A few pieces of heavy earth-moving machines, namely, tractors, power shovel and end-dumpers are used on the dam construction. These machines, unless properly matched and made full use of, do not give economical performance. For the period of 12 months from 1st April 1956 to 31st March 1957 the shovel worked for 490 hours while the tractors & the dumpers worked for an average period of 830 and 790 hours only. The dumpers which were used for conveying mortar are loaded manually and the machines are idle during the period of loading which is over half an hour at a time. This operation is therefore inefficient & uneconomical. Diversion of these machines to the saddle earth dams or other suitable work is indicated.

4.8. The average daily progress of rubble masonry in the dam is about 13,000 cft. In the further work that has to be done, the average progress will have to be pushed upto about 15,000 cft. per day so as to attain the targets. With proper organization and planning it should not be difficult to achieve the progress in view of the fact that the maximum daily progress has been 25,000 to 30,000 cft. We have been assured by the Chief Engineer, Mysore, that he would be able to achieve this target without any additional staff.

4.9. On the Lakkavalli Project, a number of further sub-classifications of each of the main strata (*viz.* soil, murum, soft rock and hard rock) is introduced. As admitted by Executive Engineers in charge of works, it is not possible to follow these numerous classifications in actual practice. Therefore, the piece-workers are paid at average rates. It is, therefore, desirable to follow only few broad classifications which would minimise doubts regarding correctness of classifications and avoid the possible disputes or abuse.

5. CANAL WORKS NEEDING URGENT ATTENTION

5.1. *Tunnel in miles 52 of the Right Bank Channel.*—Speedy construction of this tunnel has become a matter of crucial importance. Major portion of irrigation included in the Project is in the command of the Malebennur and Davangere Branches, which take off from the Right Bank Channel beyond the tunnel. Hence unless the tunnel is completed expeditiously the development of irrigation will be seriously throttled. An indent for the tunnel construction machinery costing Rs. 39 lakhs is at the moment pending with the Government of Mysore.

5.2. Appendix VII shows a scheme for constructing the tunnel together with a list of equipment which is considered sufficient for completing it in 18 months. According to this scheme, the investment in the tunnel machinery can be reduced by Rs. 10 lakhs.

5.3. *Alignment of the Right Bank Channel and the Davangere and Malebennur Branches near the Sulekere tank.*—In the original Project, provision was made for the Right Bank Channel, after emerging from the tunnel, to drop in the existing Sulekere tank and to take off the two branches from this tank. The tank is a fairly large one and is formed by a short earth dam constructed a few centuries ago. As the levels adopted in the original Project were not quite suitable, it was subsequently decided to take off the Right Bank Canal from the Lakkavalli Dam at a level ten feet higher than originally intended. Further increase in the level at the tail end of the tunnel was gained by easing certain curves and thereby shortening its length. Dropping the canal into the tank was then no longer obligatory and alternative alignments were investigated in detail for bypassing the tank. These alternative alignments which became a subject of some controversy, were under consideration. In the meantime the construction of Section III of the Right Bank Channel and the Branches was consequently held up. After studying the problem, personal visits to the site and discussions with the Mysore Engineers, the Team has recommended proposals contained in appendix (VIII) adoption of which results, on the basis of estimates furnished by the State Government, in a saving of Rs. 20—54 lakhs over all other possible alternatives.

6. DEVELOPMENT AND MANAGEMENT OF IRRIGATION

6.1. A special feature of the Lakkavalli Project is that the soil, health and economic surveys of the commanded areas were taken up at the same time as administrative approval was given to the Project. These surveys were carried out in great detail and completed expeditiously.

6.2. These surveys were carried out under the direction of the Bhadra Reservoir Development Committee. The terms of reference of this Committee included the determination of the contribution (betterment charges) and water rates to be recovered from the agriculturists, and sending up recommendations to Government. They had to finalise the alignments of the channels, examine the nature of soils in the commanded areas and recommend the best plans for raising crops suitable to the soil. Consequent on the development of irrigation, effect of malaria in the area and ways and means of preventing it had also to be decided upon. A survey of the economic well-being of the population in the area had also to be made. In short a detailed survey of the commanded area from all aspects had to be conducted and final recommendations made for avoiding and overcoming the evil effects of introducing wet cultivation, and the means for achieving the best results from the Project.

6.3. The following officers were appointed as members of the Committee.

(1) Revenue Commissioner—*Chairman.*

(2) Chief Engineer of Mysore.

(3) Director of Agriculture.

(4) Director of Public Health.

(5) Superintending Engineer, Tungabhadra Valley Circle.

The Assistant Engineer, Bhadra Reservoir Project served as the Secretary of the Committee.

6.4. The Sub-Committee consisting of the following officers representing different departments was formed to carry out the actual work of surveys and field investigations.

(1) Assistant Commissioner.

(2) Assistant Engineer.

(3) Assistant Director of Agriculture.

(4) Health Officer.

These sub-committees were assisted by appropriate subordinate staff.

6.5. The total cost of surveys for the gross commanded area of 3,77,164 acres was Rs. 3,50,000 and the work was completed well in advance of the construction work. 494 villages were surveyed. Average cost of surveys per village works out at Rs. 710.

6.6. The entire area was divided into a number of zones and detailed reports for each zone together with zone map were prepared by the Sub-Committees and submitted to the main Committee. A sample of a zone report and a zone map are enclosed (Appendix IX).

6.7. A summary of the recommendations of the Bhadra Reservoir Development Committee's report is at Appendix X.

6.8. To implement the recommendations of the Bhadra Reservoir Development Committee, Government appointed another Committee (*vide* Appendix XI). This Committee is taking all the necessary measures to promote a rapid and planned development of irrigation in the Project area. The Committee also deals with the problems of rehabilitation of population displaced from the reservoir area.

6.9. *Water rates and contribution.*—In August 1954 Government of Mysore constituted a Committee under the Chairmanship of the Minister of Agriculture to examine the question of rationalisation of scales of water rates and contribution in respect of irrigation works in the State.

6.10. The recommendations of this Committee were accepted by Government with certain modifications (*vide* Appendix XII). These orders will be applicable to the Lakkavalli Project.

6.11. It is thus seen that all the necessary steps have been taken to prepare a sound plan for irrigation and there is a high level committee to implement the same. Government interest has also been secured by fixation of betterment charges and water rates. However, judging from the rates for perennial crops that are prevalent in contiguous States, there seems to be scope for an upward revision of water rates on this Project.

6.12. For an orderly development of irrigation in accordance with the programme of crop Planning envisaged by the Bhadra Reservoir Development Committee and also to ensure economical use of water it is necessary that there should be an effective control over the management of irrigation. Particularly, in the present case limited supplies are available and any inadequacy in management will result in a reduction of the total acreage to be developed under irrigation and thus the possibility of discontent among cultivators situated at the tails of the channels may arise.

6.13. In Bombay, Punjab and some other States, it is the Irrigation Department that is responsible for the management of irrigation upto the point of preparing assessment papers. Regulation of canals has necessarily

to be done by the Irrigation Department as a part of its technical work. Annual irrigation programmes, the water requirement of crops, wastage or unauthorised use of water, untoward consequences of irrigation under certain circumstances, such as water logging and salt efflorescence, are closely allied matters ultimately linked with the regulation of canals and as such ought to be under the unified control of the Irrigation Department. The Bombay Public Works Department have under the control of the Executive Engineers fully manned establishment dealing with applications from cultivators to receive irrigation for crops, the programme for issuing water to the authorised crops, preparation of assessment papers, checking malpractices by taking penal actions against offending irrigators. The Irrigation Department also conducts periodical surveys of damaged areas and subsoil table and is responsible for preparing and executing drainage scheme. These surveys also enable the Department to determine the areas in which perennial crops should be permitted. Thus the Irrigation Department has a control over the irrigation management in a full measure resulting in an efficient and economic use of water. Therefore it is strongly recommended that the Government of Mysore may follow Bombay's pattern as far as possible.

6.14. From the proceedings of the Special Committee constituted to inquire into the depletion of the Krishanarajasagar some years ago (Appendix XIII) it is seen that it was intended to introduce on the Irwin Canal the "Block System" of irrigation prevailing in Bombay, with suitable modifications, but, for various reasons, this has not been done nor any other system introduced and haphazard irrigation has resulted. Such a state of affairs should not be allowed to occur on the new areas in the command of the Lakkavalli Channels.

6.15. Now, that irrigation has commenced on the Left Bank Channels, immediate steps need to be taken as indicated above.

7. POWER GENERATION

7.1. In order to utilise the waters stored in the Bhadra Reservoir for power generation as well, two power stations are being constructed—One at the right bank of the river with two machines each rated at 7,200 KW. utilising the irrigation waters to be discharged into the right bank canal, and the other at the left bank with one machine of 2,000 KW. utilising the waters to be discharged into the left bank canal and two machines of 12,000 KW. each discharging waters into the river below the dam.

7.2. An average daily discharge of 627 cusecs has to be maintained in the river below the dam-500 cusecs for irrigation of lands under the Bhadra Anicut (which is located about 8 miles downstream of the Dam) and 127 cusecs for industrial and domestic water supply below the Anicut. This water is proposed to be utilised for power generation in the two 12,000 KW. units which may be called river-bed units.

7.3. It is found that in a year (1937-38) of average run-off, commencing with reservoir level at 123 on 1st July, full irrigation requirements under the two canals can be met throughout the year and a discharge of 627 cusecs can be maintained throughout the year in the river below the Dam. Besides, a surplus of 23826 mcft. of water will have to be let out in the river bed in order to bring down the lake level to 123 by the end of June as there should be no carry-over according to the terms of the agreement. During a lean year (1938-39), however, it would not be possible to maintain a discharge of 627 cusecs in the river bed right through the year. From December 15 to June 15, this discharge will have to be limited to the natural inflow in the river which is much below 627 cusecs. It is understood from the P.W.D. Engineers that river discharges in a lean year could be reduced to 327 cusecs during the wet months so as to increase the flow in the dry period (December—June) of the year.

7.4. The two power stations will feed into the existing transmission grid of the State. As the discharges into the two canals have to be continuous, the power generated in the three units discharging into the canals will also be continuous. The discharge through the river-bed units can however, be varied so that they operate during the system peak hours only. It has been found that even in the leanest year, it is possible to develop a firm peak output of 25,000 KW. from the proposed installation of generating units. The canal units will be operating continuously while the river bed units would operate during the morning and evening peak hours only.

7.5. In order to enable the Mysore power system to accept a firm additional load of 25,000 KW. at *the system load factor,* it would be necessary to carry over waters from surplus years to lean ones or to supplement

the energy resources at Lakkavalli by those available in the rest of the Mysore State power grid say at Sharavathi.

7.6. As the system load grows up, the peaks of the load curve become sharper and the energy in a given peak cut-off decreases. Consequently, with the same quantity of water, it would be possible to generate power at Lakkavalli to meet a *peak* demand of more than 25,000 KW. It is not possible to put in an additional penstock pipe now. However, absence of this provision is not considered to be an appreciable loss of resources in view of the fact that a very large generating station is projected to be developed in the State at Sharavathi during the 2nd Plan period. It is suggested that during the final negotiations with the successful tenderer, as much overload capacity as is practicable should be called for and incorporated in the final designs of the generating units. It is desirable to provide some extra penstock openings when building such dams in future. It will generally be found in expanding integrated power systems, that as the systems expand, additional hydro generating capacity can be utilised economically with the same water resources.

7.7. As it is not possible to forecast the nature of a monsoon season in advance, it would appear to be necessary to regulate the reservoir levels in the following pattern. As the monsoon months are generally from July to September, the storing of the monsoon inflows in the reservoir should be regulated so as to have it full (level 186) on the 1st October. The lake may then be depleted to the lowest possible by the following June and then the level built up again to 186 during July to September. If it is found during July that the monsoon may not be normal during that year, the discharge in the river bed could be suitably reduced so that the lake level could be built up as near to 186 as possible by the end of the South West monsoon.

7.8. There is no doubt that the power and energy from this Project would be utilised as soon as it is made available owing to the acute power shortage prevailing in the State.

8. CONSTRUCTION COSTS

8.1. The rates of wages of staff and labour are a feature of the economy of the Mysore State. The cost of masonry and of canal excavation is remarkably low. This is due, in no small measure, to the large number of labourers, skilled and unskilled, who have been employed on masonry and excavation works for years together and have attained a high degree of efficiency.

8.2. The rates for the main items of construction are given in appendices XIV—A to H.

8.3. The cost of Rs. 940 per acre of irrigated area and Rs. 915 per KW. of firm power may appear to be high having regard to the low rates of construction prevailing in the State. The factors contributing to the high overall cost are:—

(a) High cost of constructing storage dams as against the comparatively low cost of diversion weirs where the canal supplies can be met with from the run-of from the river.

(b) High cost of constructing the main canals, which pass through difficult terrain, involving heavy rock cutting and numerous cross drainage works. The Right Bank Channel involves excavation in rock cuts, as much as 60 feet deep and one $2\frac{3}{4}$ mile long tunnel.

8.4. The works are mostly being carried out departmentally in an economical manner. Stones for the dam are being supplied by piece workers whose rates are determined periodically on the basis of quotations invited publicly. Lime Kankar and bricks for Surkhi are acquired in the same manner. Grinding of mortar is done departmentally. The masonry work for the dam is carried out by masons and other workers employed on nominal muster rolls and the gangs are given set tasks to ensure good quality. The excavation of canals is being carried out through pieceworkers and only the masonry structures on the canals are being excavated through contractors.

8.5. Bulk of the work is thus being carried out departmentally. This has not only resulted in a work of good quality at economical rate, but has afforded a high degree of construction experience to the Project engineers. Departmental work needs greater strength of establishment for supervision but in Mysore little difficulty has been experienced in the matter of staffing.

8.6. The estimated cost of the Project was Rs. 17.75 crores. (The original Project estimate of Rs. 8.88 crores having been based on arbitrary rates of 25% over the pre-war rates, cannot be taken for the purpose of comparison). The estimate is now under revision and the cost is likely to go up to Rs. 24-25 crores. This increase has resulted mainly due to increased quantities of works consequent on an increase in the scope of the Project and the important items which have led to this excess are listed below:—

(a) *Dam*

(1) Increase in the height of the dam to impound additional storage.

(2) Increase in cost of land acquisition due to increased area of submergence.

(3) Increase in the quantity of the excavation for foundations due to the necessity of deeper excavation to reach sound rock.

(4) Cost of extensive drilling and grouting for consolidation and curtain grouting.

(5) Increased cost of protection works below the spillway.

(b) *Canals*

Increased work on the excavation, masonry and tunnel works due to the increased capacities of the canals to serve a greater area, the irrigated command having been increased from 1,80,000 acres to 2,34,200 acres.

(c) Increased cost of power houses and power plant due to the firm power generation having been raised from 12,682 KW. to 25,000 KW., the installed capacity for the firm power generation now being 40,000 KW.

The general rise in prices of material and wages of labour is also bound to reflect in the revised cost of the Project.

8.7. On this Project minimum use is being made of cement. Steel is being used on such items as gate structures etc., where its use is unavoidable. Some steel is being used on canal structures where there may be scope for a further saving. As the construction is not mechanised the outlay on machinery has been comparatively small (app. XV-XVI). The construction of the tunnel, however, has to be fully mechanised and it is essential that foreign exchange to the tune of Rs. 30-40 lacs be made available.

8.8. In spite of the cost of the dam and the heavy cost of canals, the Project is expected to be self-supporting. It has certain particularly good features such as detailed investigations for localization of irrigation, economy

in the use of steel and cement, conservation of foreign exchange involved in the purchase of foreign machinery and materials etc. which could be adopted by other Projects where circumstances permit. This Project deserves to be assured of timely and adequate grants to enable its completion within the target date.

N. V. GADGIL,

November 16, 1957. *Leader.*

9. SUMMARY OF REPORT

9.1. The Project is designed to impound 90,000 million cubic feet of water on the River Bhadra, irrigating 2,34,000 acres of land in Mysore State, and generating 25,000 KW. firm power, installed capacity being 40,400 KW.

9.2. The Project was initially started in 1947 and at the time of writing this report *i.e.,* by June 1957, an expenditure of roughly 9 crores was incurred out of Rs. 24 crores, the estimated cost of the Project. The dam is raised to nearly half the total height and irrigation was started on the left bank canal during the last year (1956-57). The excavation of the main canal is nearly complete in the first 50 miles, beyond which it has to cross a hill range through a tunnel, approximately 2¾ miles in length. This tunnel is yet to be started, to facilitate which special machinery worth about Rs. 30 to 40 lakhs would be necessary and the Team has recommended to Government of India to release the necessary foreign exchange required to purchase such of the machinery as might not be available from the surplus on other Projects in the country. The Government of Mysore have been aware of the urgency of this work and are now busy in taking all the necessary steps to expedite the execution, since the Project is scheduled to deliver irrigation water up to the tail end by 1961 June. Also, the report has suggested an alternative list of machinery which would save about Rs. 10 lakhs.

9.3. The Irrigation and Power Team noted that there was another factor holding up the execution of the canal beyond the tunnel portion *viz.* the problem of by-passing the Shantisagar Reservoir, within a few miles after the tail of the tunnel. This problem could be solved by recourse to any one of a number of alternatives which were being discussed by the Mysore Engineers. The Team of Engineers and the Members of the Consultative Committee after discussing the matter with the State Engineers, proposed one of the alternatives, which happens to be the easiest and cheapest bringing a saving of Rs. 20 to 50 lakhs over the other possible alternatives.

9.4. The Team has found the construction staff as generally sufficient and efficient. However, they have made recommendations to strengthen the organisations incharge of the designs and quality control over construction materials and techniques. The report reveals that the establishment charges on this project are only 4% of the outlay, as against 10 to 12% as considered normal by the Engineers' Seminar. The reasons for

this are reported to be mainly due to the very low scales of salaries prevailing in the State and partly due to the understaffing as mentioned before.

9.5. The Report suggests the creation of another Circle under a Superintending Engineer to take up the construction of the Hiremalali Tunnel and the works beyond, so as to enable finishing of the work before the scheduled date.

9.6. The Report appreciates the Mysore practice of appointing a Standing Technical Advisory Board, consisting of the Chief Engineers of the State and retired Chief Engineers of the State and presided over by the Minister for P.W.D. The Engineers work almost honorarily and provide an excellent consultation at all the stages of planning, designing and execution of Projects. This practice is recommended for emulation by other States engaged in construction of development Projects.

9.7. The Report notes with appreciation the excellent manner in which the problem of Development of Irrigation has been tackeld by the Mysore Government, who appointed a Committee known as Bhadra Reservoir Development Committee consisting of a Revenue Commissioner as a Chairman, with Chief Engineer, Director of Agriculture, Director of Public Health and the Superintending Engineer of the Project, as members. This Committee prepared the Irrigation Development Report, which not only surveyed all the irrigable area from irrigation point of view, but also from agricultural and health point of view, and prepared zone maps for irrigation with the proposed crop patterns for each village.

9.8. To implement the recommendations of the above Committee, another Committee was appointed, so as to expedite actual development of irrigation on the pattern set and enable the State and Society to realise the benefits of the Scheme without loss of time as soon as the irrigation facilities become available.

9.9. The State has also seen to it to decide the Betterment Levy etc. However, the report reveals a scope for and recommends recourse to upward revision of water rates, as they are lower than those obtained in the Bombay State. In order that the irrigation management and administration should not be slack and haphazard, the Report recommends the adoption of the Block-system and the Canal Rules and the system of irrigation management, as practised in the Bombay State, as far as possible.

9.10. As Bhadra is in the Inter-State River Basin of Tunga Bhadra Valley, which covers the erstwhile States of Mysore, Hyderabad and Madras the utilization of the waters by the different States is subject to an agreement reached between these three States. With the recent reorganization of the States, the position has changed and it is only Mysore and Andhra Pradesh that have rights over these waters. Hence the report

points out the need for revising this agreement. Also, it is recommended that the earlier restrictions in regard to carrying over the waters in the Bhadra Reservoir from year to year should be removed, as such a carry-over would increase the firm electrical energy out-put annually, without affecting the interests of the State lower down.

9.11. The Report appreciates the fact that this Project is mostly carried out by utilizing only the local labour and material, without adopting much mechanisation, and avoiding rare and costly building materials like cement which are very sparingly used, as the bulk of the masonry is all in lime mortar.

9.12. In conclusion the Report recommends expeditious sanction of adequate funds for the Project to enable its completion within the target date.

List of Appendices

I. Principal features of the Lakkavalli Project.

II. Clause 2 of the Mysore-Madras Agreement regarding sharing of Tungabhadra Waters.

VII. A note on the construction plant for the Hiremalali Tunnel.

VIII. A note on the alternative alignment of the Right Bank Channel—Section III—and Davangere and Malebennur Branches.

XVI. List of machinery required for Hiremalali Tunnel—(As planned by the project Authorities).

*All the Appendices mentioned in the Report have been supplied to the State Governments concerned and also to the Irrigation & Power Ministry. The rest of the Appendices not added to the Report are available in the Office of the COPP.

APPENDIX NO. I

Principal features of Lakkavalli Project

(*a*) Dam

1.	Location	Latitude 13°42′ Longitude 75°30′20″

The site is at a narrow gorge through which the Bhadra river flows, about one mile west of the Lakkavalli village, district—Chikmagalur.

2.	Catchment area	·760 sq. miles.
3.	Annual rainfall in the catchment . .	46 to 202 inches
4.	Maximum flood experienced (computed) .	94,600 cusecs.
5.	Design flood	1,20,000 cusecs.
6.	Height of masonry dam over deepest foundation	247 feet.
7.	Length of dam at F. R. L. . . .	1,385 feet.
8.	Length of earth dam in first saddle on left bank	1,400 feet.
9.	Length of earth dam in second saddle on bank	780 feet.
10.	Area of water spread at F.R.L. . .	45·53 sq. miles.
11.	Maximum stress developed in masonry of dam	10 T./sq. foot.
12.	Effective storage capacity of reservoir above +100	63,000 m.c. ft.
13.	Free board (masonry dam) . . .	8 feet.
14.	Sill of irrigation sluice on right bank (2 Nos. 8′×15′)	+100 (above river bed)
15.	Sill of irrigation sluice on left bank (6′×12′)	+36 (above river bed)
16.	Spillway Gated spillway with crest gates	4 Nos. 60′×23½′
17.	Sill of under sluices (2 Nos.×6′×15′) .	+45 (above river bed)

(*b*) Power Plant

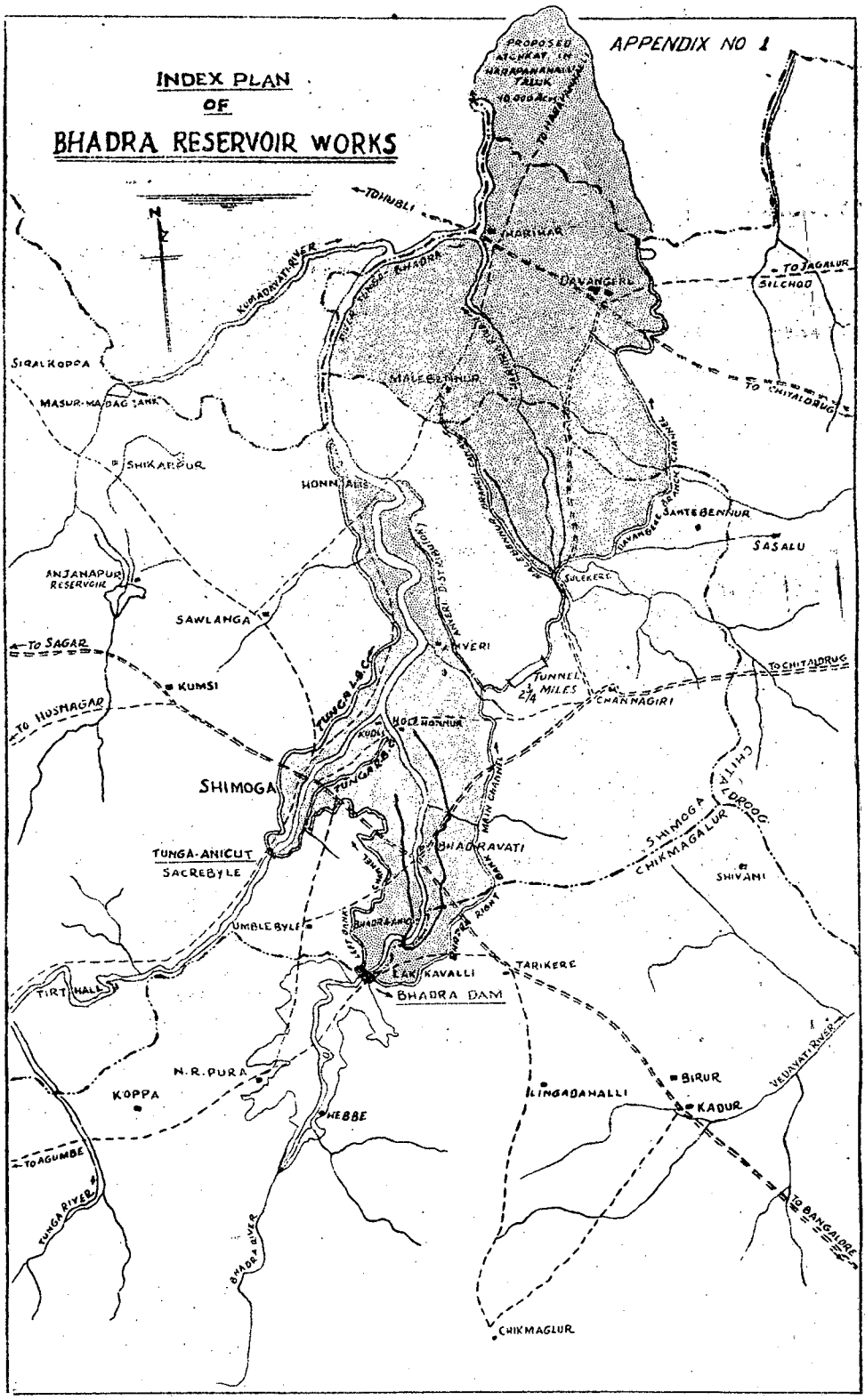
	Right bank units	River bed units	Left bank units
1. No. of penstocks . . .	2	2	1
2. Dia. of penstocks in feet . .	10	10	6
3. KW capacity of each machine .	7,200	12,000	2,000
4. Total KW installed capacity .	14,400	24,000	2,000
5. Total KW installed capacity of Project.	..	40,400	..
6. Firm peak in KW . . .	..	25,000	..

(*c*) Canals.

1. Full designed discharge of left bank canal at head. .	..	335 cusecs	..
2. Full designed discharge of right bank canal at head. .	..	2,500 cusecs.	.
3. Total length of Canals . .	..	220 miles	..
4. Total irrigated area. . . .	..	2,34,200 acres	..

APPENDIX NO 1

INDEX PLAN OF BHADRA RESERVOIR WORKS



(Part) APPENDIX II

CLAUSE 2 OF THE MYSORE-MADRAS AGREEMENT REGARDING SHARING TUNGA-BHADRA WATERS.

2. The Government of Madras agree to the Government of Mysore increasing the capacity of the Lakkavalli Reservoir beyond the limit permissible under clause I in order to enable the Government of Mysore to have additional storage, solely for power purposes the supply required for such purposes being drawn off through the sluices; but such additional storage shall be returned without diminution (except diminution by reason of evaporation and percolation) within the same year to the river Bhadra below the existing Bhadra Anicut through sluices or in such other manner as may be mutually agreed upon by the Governments of Madras and Mysore and in accordance with the working tables and rules of regulation approved by the Chief Engineers of the two Governments.

APPENDIX VII

A Note on the Construction Plant for the Hiremalali Tunnel

The total length of the tunnel is 13,600 ft.

Four mine shafts are being presently driven at site to provide more headings. From each shaft two headings will be driven, and the operations will be so phased that with a single set of equipment the work can proceed uninterruptedly on both faces. Compressor and blowers will be installed at mine-head and pipe lines run down the shaft to both faces. While at one face drilling and blasting operations will be in hand, mucking equipments such as N.G. Wagons, mine loader and mine head hoists will be working against the other face. After every four hours or so the two operations are switched over, thus providing continuous operation. For efficient working, about 1,000′ is considered to be the maximum drive of the two headings from either side of the shaft, as otherwise it would be increasingly difficult to switch over operations and delays will result.

Although four shafts are being sunk, it would suffice to obtain equipment for working only two mine heads at a time. Air compressor and blower stations will be provided at the end headings and also with the mine headers at the shafts which are being worked.

The plant and equipment necessary for these operations has been figured on the basis of 2 shifts working although there is no reason why the work should not go on round the clock. Similarly 300 working days have been assumed in one year whereas it may be possible to continue the work throughout the year by staggering labour. Anyway there are the possibilities which can further improve the time schedule but no scaling down of construction plant on these accounts is contemplated.

It is understood that some of the rocks are water-bearing. It is recommended that one drill hole should be carried to about 20-30 feet ahead to tap such water bearing seams and promptly seal them by pumping grout into them under pressure through the drill hole.

The total period of construction has been taken to be 1½ years, 300 days for excavation and 350 for lining, with an over-lap of 200 days. The lining operations are proposed to be started as soon as work from a shaft has been completed. This should be after about 100 days of the beginning of operations. $\left(\frac{1{,}000'}{10'/\text{day}} = 100 \text{ days}\right)$

The total cost of equipment as per this programme works out to about Rs. 28.70 lakhs against Rs. 39.04 lakhs as provided, basing the costs on existing Project figures.

Abstract of costs (In Rupees)

1. Pneumatic equipment	3,60,000
2. Hoisting equipment	96,500
3. Drilling equipment	4,44,400
4(a). Pumps	2,10,000
4(b). Colony W.S.	16,000
5. Electrical equipment	6,83,500
6. Transport equipment	3,41,000
7. Miscellaneous T. & P.	3,28,140
8. Workshops	93,500
9. Telephone equipment	30,000
	26,03,040
Add 10% for spares	2,60,304
	28,63,344
	say 28.63 lakhs

The provision made in the Project for items 4(b), 5, 8 and 9 has not been reduced although there appears to be some scope for economising in item 5 Electrical equipment.

Construction equipment requirements.

Length of the tunnel =13,600 ft.

Assume driving rate

7 ft./8 hours shift a day on dry heading

& 3 ft./8 hours shift on wet heading.

Assume 50% to be wet headings.

$\therefore$ Average progress per heading $= \frac{7+3}{2} = 5$ft.

(Compare rate of 5 ft. shift assumed in S. T. A. Sub-Committee's note).

Assume 2 shift work,

average progress/heading/day=10 ft.

Days available for work =300

$\therefore$ No. of headings required $= \frac{13,600}{3,000} = 4.5$

Adopt 6 headings, being provided by 2 mine heads (and shafts) providing 4 headings and 2 end faces.

Time cycle per 8 hour shift.

1. Drilling $2\frac{1}{2}$ — 3 hours.
   Smoke clear 30 minutes
2. Mucking $3\frac{1}{2}$ — $4\frac{1}{2}$ hours.

These two operations to be alternated at the two faces being driven from a shaft.

Total quantity of excavation = 41,42,221 cft.

$$\text{Quantity /ft. run} = \frac{41,42,221}{27 \times 13,600} = \frac{306}{27} = 11.3 \text{ cu. yd.}$$

Excavation/face = 7×11.3 = 79.1 say 80 cu. yds.

Assume $1\frac{1}{2}$ ft. of hole is required per cu. yd. of rock excavated.

$$\therefore \text{ Length of holes required/face} = \frac{80 \times 3}{2} = 120 \text{ ft.}$$

Assume progress of a jack hammer (drifter) 8 ft./hr. or 20 ft./2 $\frac{1}{2}$ hrs.

$$\therefore \text{ No. of drifters required/headings} = \frac{120}{20} = 6, \text{ provide } 7$$

AIR required/jack hammer=80-90 cu. ft. @ 100 psi.

$\therefore$ A 750-1000 cu. ft. capacity air compressor at each heading will meet he job requirements.

N. G. Tip wagons.

No. 1 cu. yds. tip wagons trips per 4 hrs. ($\frac{1}{2}$ shift)=80

$$\text{Rate of loading required by mine loader} = \frac{3)}{4} = 20 \text{ cu. yd.}$$

List of Equipment

I. Pneumatic Equipment

1. Stationery Air Compressors 750 CFM at 100 psi	4.	
2. Stationery Air Standby . .	2	3,60,000

II. Hoisting Equipment

1. Pit head frame . . .	2	30,000
2. Winch hoisting gear etc. .	2	30,000
3. Cages for 1 cu. yd. mine cars.	5	12,500
4. Tugger Hoists for portals .	2	24,000
Total . .		96,500

III. Drilling Equipment

1. Drilling jumbos	6	36,000
2. Drilling Rods	700 600 200	42,000 48,000 18,000
3. Wet jack hammers required 28 at 7/face+50% spare	42	33,600
4. Air legs.	42	21,000
5. Mine Car loaders required 4+2 Standby	6	1,20,000
6. High pressure blowers	4	16,800
7. Exhaust fans	2	10,000
8. Exhaust ducting with couplings and hangers.	12000′	96,000
9. Electric grinder	6	3,000
Total		4,44,400
IV (*a*) Pumps.		2,10,000
Reduce by 25% i.e. provide 26 pumps		
IV. (*b*) Colony Water Supply		16,000
V. Electrical Equipment		6,83,500
VI. Transport Equipment		
1. 2. 3. 4. 5. 6. No change.		3,41,000
7. Diesel Locos. 2 ft. gauge.	4	1,20,000
VII. Miscellaneous T. & P. Reduce 20% as No. of mine-cars required 60-80, Trolley track 20,000 instead of 30,000 ft. etc.		3,28,140
VIII. Workshops.		93,500
IX. Telephone equipment		30,000
Total		26,03,040
Add 10% for spares.		2,60,304
		28,63,344

Say Rs. 28.63 lacs

APPENDIX No. VIII

A NOTE ON THE ALTERNATIVE ALIGNMENTS OF THE RIGHT BANK CHANNEL—SECTION III AND THE MALEBENNUR AND DAVANGERE BRANCH CHANNELS.

The alignment of the Right Bank main channel upto its exit from the tunnel and some distance beyond up to the point D has been finally fixed. The two branches, Malebennur and Davangere, take off from the tail reach of the Right Bank Channel and command a substantial area.

2. A large tank known as the Sulekere tank (Shanti Sagar) lies in the path of the Right Bank Channel. This tank has its own catchment area of 226 sq. miles has an atchkat of 6,000 acres and irrigates about 4,500 acres. Its gross capacity at F.S.L. (1982.78) is about 3,800 m.c.ft. and water spread about 6,000 acres. The tank is formed by the construction of an earth dam across a narrow gorge in the Sulekere Valley and is of an ancient origin. The dam has a very heavy section, being about 100 ft. wide at the top and having nearly 18 ft. free board.

3. The alternative proposals for the alignment of the Right Bank Channel and its branches are described below:

(I) The Malebennur Branch Channel on a falling contour along DR1R . The Davangere Branch Channel on a falling contour along DFJVGWH (Southern and Eastern peripheries of the tank).

(II) The Right Bank Channel on a falling contour along DR1 R2. The Malebennur Branch Channel to start from R2. The Davangere Branch Channel on falling contour along R2 PO (skirting a hill slope), crossing the Sulekere Valley below the Sulekere dam along ON by means of an aqueduct or a canal syphon, continuing along the near side of the hill situated on the right flank of the Sulekere dam, crossing the waste weir channel of the tank over an aqueduct and finally joining the alignment in proposal I at H.

(III) The Right Bank Channel to terminate in the tank as shown by DK in the plan. The Malebennur Branch Channel to take off from the tank along XR1 R2. The Davangere Branch Channel to take off from the tank along YH.

(IV) The Right Bank Channel as in proposal II. The Malebennur Branch Channel as in proposal II. The Davangere Branch Channel on a falling contour along R1 LM, crossing over

the bund in a R.C.C. trough and continuing beyond the bund along the alignment in proposal II. This last alternative is the one recommended by the Team.

4. According to the estimates prepared by the Project Authorities the Proposal I is the costliest (Rs. 167 lakhs). It has also the following technical disadvantages.

(a) The alignment of the Davangere Branch passes through or very close to a number of villages and to avoid these costly detours will be necessary, thereby further increasing the cost. Alternatively either the villages will have to be shifted or the channel will have to be taken through covered ducts to safeguard the health of the villages.

(b) The Channel cuts across some minor irrigation tanks and will intercept them from their commands. The tanks situated on the downstream side (tank side) will have to be breached to prevent a situation in which these tanks will remain full perpetually, giving rise to unhealthy condition and growth of malaria.

(c) The construction of certain cross drainage works for the channel will present serious difficulties. Some of the drainage valleys are very flat and the flood waters will spread over wide areas and will come up against the u/s Channel bank in long lengths.

(d) Due to seepage from the channel the strip of land between the channel and the Sulekere tank is likely to become water logged permanently, giving rise to problems of rehabilitation. The soils in the area are clayey and effective drainage will be difficult or at any rate very expensive. The proposal is now looked upon with disfavour by all parties on account of the serious disadvantages. The proposal may not therefore be considered any further.

5. Proposal II, which is estimated to cost Rs. 127 lakhs is free from objections (a) and (b) in para. 4, applicable to proposal I. The objection (d) in the case of this proposal is not of much consequence, the area of the strip being very small. The team however considers that the cost of the construction of the length PN of the channel along fairly steep bill slopes is both difficult and underestimated. For crossing the Sulekere Valley below the dam two alternatives have been suggested (i) an aqueduct supported on pile foundations or (ii) a canal syphon. These structures are estimated at 19 and 16 lakhs respectively. The foundation for these structure consists of saturated clayey soils and trial bases up to depths of 40 ft. have failed to show hard stratum. In the design R.C.C. piles, 40 ft. deep have been provided. These might have to be much deeper. The superstructure rises 90 ft. above ground level. The estimated cost (Rs. 19 lakhs) of this 1,300 ft. long structure carrying a discharge of 1,142 cus. involving costly centerings is on the low side. So also a canal syphon

with a head of 90 ft. must cost more than Rs. 16 lakhs. With such high head it would be obligatory to use steel pipes, encased in concrete and the design does not provide for such construction. This major C.D. work may cost as much as Rs. 40 lakhs. This, together with the increased cost of constructing the channel length PN, mentioned earlier, is likely to increase the cost of proposal II by another Rs. 25 lakhs at least, bringing the total cost to Rs. 152 lakhs.

6. Proposal III is estimated to cost Rs. 56 lakhs. As, however, the Branch Channels take off at much lower levels, their further lengths, particularly of the Davangere Branch Channel will involve additional excavation, as compared with proposal II, where these pass through hill saddles. This additional cost is estimated at Rs. 38 lakhs, bringing the total cost to Rs. 94 lakhs. The objectionable features of this proposal are enumerated below:

(a) The water level in the tank will remain at a high level throughout the year and there will be a dense growth of weeds along the shallow fringe of the lake, favourable to mosquito breeding, giving rise to a serious incidence of malaria. In the Mysore State great importance is attached to the question of health of population and to appreciate the implication of this question it is worth-while recalling the fact that 112 old tanks in the command of the Irwin Canal, ex-Krishnarajasagar reservoir had to be breached to check malaria. The condition of the affected villages has been vividly described in official reports. "Tanks in the atchkat areas situated below the channel will be full always due to the collection of seepage water from the channel, as well as from the atchkat above. Incidental to this the water table rises, dampness comes up and marshy areas are formed. All these conditions are so favourable for the breeding of mosquitoes that the area soon gets malarial and the deadly disease overtakes the population resulting in heavy mortality. Awful stories are told of the sufferings of the people due to the scourage of malaria. Several villages have gone out of existence. In some, it is said there are no male members at all, all of them having succumbed to malaria. It is even said that the young men of some of the villages affected by malaria are denied brides for marriage from other villages. The evil does not confine itself to human beings only, but has spread to cattle also. There is a terrible growth of weeds in the shallow portions of the tank water spread, which gives rise to enormous growth of snail population. The cattle that go to the tank for drinking water, catch a kind of disease called 'Lever Fluke Disease', which is due to the snails harbouring in the weeds of the tank. The breaching of tanks and other anti-malaria measures have gone a long way in mitigating the evil and restores the people of the tract to their original health and stamina in a large measure". In the face of these facts, based upon previous experience, it is not surprising that there

is a vehement opposition to the proposal of tailing the channel into the Sulekere tank.

It has been argued that by regulating the discharge of the Right Bank Channel the level of water in the tank could be varied at will and thereby the growth of weeds prevented. This proposition is not free from practical difficulties. The main canal has a discharge of 2,500 cusecs and is 58 miles long and the effect of its regulation will take a considerable time to reach the tank. When the tank is full from the discharge from its own catchment there is every possibility of wastage of canal water over the waste-weir. From the tables prepared showing the operation of the channels and the resulting levels in the tank it is seen that the variation in the water levels is of the order of a very gradual variation of 4 feet only, as against a much larger variation which occurs under the present conditions. Any attempt to introduce larger variations by manipulating the discharges of the main canal will affect the generation of power resulting in a direct loss of power and of revenues.

(b) The Malebennur and the Davangere Branch Channels taking off from the tank will have their bed levels several feet lower than those in proposal II. This factor not only results in a substantially increased cost of excavation of the channels in proposal III but to gain the same command they have to be excavated in a longer lengths. This must also result in an additional cost, which has yet to be computed.

7. Proposal IV. This proposal has none of the disadvantages of proposal III and the objectionable features of proposal II. This possibility of taking the Davangere Branch over the Sulekere bund has been examined by the Project authorities and an estimate of cost prepared. It had however been considered that it was undesirable to take the channel over the bund because the bund was old. The Team considers that it is possible to construct a reinforced concrete duct on the bund without affecting the security of the bund or causing any danger to the tank. There should be no risk in taking the channel in a concrete trough over the bund, with copper strip joints to allow for any slight settlement. The load on the foundation is of the order of half a ton per sq. ft. only. The cost of this proposal may be about Rs. 113.5 lakhs. The advantages of this proposal are:

(a) It leaves the Sulekere tank undisturbed;

(b) It is the cheapest practical proposal;

(c) It does not involve any difficult construction such as the aqueduct or syphon across the sulekere valley which would need at least two years for completion and consequently the date of opening the Branch Channels can be advanced by one full year.

(d) This proposal has found favour with practically all the members of the standing Technical Advisory Committee and the Project Authorities.

N. B.—The benefits accruing on account of irrigation on the Davangere and Malebennur Branches being made available earlier by one season have not been computed, but they would be substantial.

(PART) APPENDIX No. XVI

LIST OF MACHINERY REQUIRED FOR HIREMALALI TUNNEL WORKS—RIGHT BANK CHANNEL—SECOND—BHADRA RESERVOIR.

(As planned by the Project Authorities)

"ABSTRACT"

Sl. No.	Sub-Head	Cost in Rs.
1.	Pneumatic Equipments	5,60,000
2.	Hoisting Equipment	4,69,000
3.	Drilling Equipment	6,07,800
4.	(*a*) Pumps	2,80,000
	(*b*) Colony Water Supply	16,000
5.	Electrical Equipment	6,83,500
6.	Transport Equipment	4,01,000
7.	Miscellaneous Tools & Plant	4,08,300
8.	Workshop	93,500
9.	Telephone Equipments	30,000
		35,49,100
10.	Spare Parts 10 Per Cent of Items 1 to 9 (Approx.)	3,54,910
		39,04,010
	or say	39,04,000

NOTE :—The Abstract Estimate comprises not only the machinery required for tunnelling but also for other services such as water supply and lighting to colony etc.

GMGIPD—NS—57PC—4-12-57—2,000.

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

Dated 68 B Rh 57

Dear Sir,

I ~~am~~ ~~write~~ to acknowledge with thanks the receipt of 12 copies of the Lakkavalli Report sent with your letter No. CPP / IQP / 110 / 57 / 2477 dt 21-6-58.

Yours faithfully,

30/6

Sri D. S. Bonker

Secy Consultative committee

Irrigation & power projects.

Krishi Bhavan

Queen Vittoria Rd

New Delhi.

27/6/58

27/6/58

Issued

2/7

WD 0258—GPB—PZS-1,20,000—1-7-55.

157

K.B.Murarappa, B.E.,
Under Secretary to Government,
PublicWorks Department.

Mysore Government Secretariat,
'Vidhana Soudha',
Bangalore, dated, 2 June 1958
Ashada, 11 Saka Era 1880.

DO No.PWD 68 BRP 57

Dear Sir,

I acknowledge with thanks the receipt of 12 copies of the Lakkavalli Report sent with your letter No. COPP/I & P 110/57/2477 dated 21-6-1958.

Yours sincerely,

KL
11

c/c

To

Sri.D.S.Borker,
Secretary, Consultative Committee,
Irrigation and Power Projects,
Krishi Bhavan,
Queen Victoria Road,
NEW DELHI.

PWD 68 BRP 57

CHIEF SECRETARY
NO. 790
11 FEB 1957
GOVERNMENT OF MYSORE

No.COPP(1)/5/57.
Committee on Plan Projects
Planning Commission,

Reserve Bank Building,
Parliament Street,
New Delhi.

New Delhi,
February 7, 1957.

SECRETARY TO GOVT.
329
PLANNING DEPARTMENT

From

Shri Indarjit Singh,
Joint Secretary, Finance and
Secretary, Committee on
Plan Projects.

To

The Chief Secretary,
Govt. of Rajasthan, Jaipur.
Govt. of Madhya Pradesh, Bhopal.
Govt. of Mysore, Bangalore.

Subject: Organisation of investigations into Irrigation and Power Projects by the Committee on Plan Projects.

Sir,

In pursuance of paragraph 2(1) of Planning Commission letter No. PC(CDN)/23/56, dated September 20, 1956, the Committee on Plan Projects has decided to organise a study of Chambal and Lakkavali (Bhadra) Irrigation Projects. The Terms of Reference of the Team are given in an Annexure to this letter.

2. The Leader of the Team will be assisted by a Consultative Committee of senior Engineers, who, after necessary visits to the Projects concerned, will formulate an outline of a plan for the evaluation of the Projects. The Team proper will conduct investigations in accordance with the plan laid out subject to such discussions as the Leader of the Team may think necessary with the Consultative Committee during the course of the investigations.

3. The Leader of the teams for the both the Projects will be Shri N.V. Gadgil, M.P. The Consultative Committee

PD 18/SFYS/57
12 FEB 1957
186
PLANNING BRANCH

-/-

to advise him would consist of the following:

1. Shri A.N. Khosla, Vice Chancellor, Roorkee University.

2. Shri N.N. Iengar, Adviser, Tata Power Co., ~~Consulting Engineer to the Iron & Steel Ministry.~~

3. Shri Thirumale Iyengar, Chief Engineer, Hirakud.

4. Shri R.K. Gupta, Managing Director, National Projects Construction Corporation.

A person with experience of Works Accounts and finance may be invited to serve on the Consultative Committee later.

4. The names of the members of the Team will be intimated shortly. It is requested that the necessary facilities may be given to the Consultative Committee and the Team for the study of the Projects.

Yours faithfully,

(Indarjit Singh)
Joint Secretary, Finance
&
Secretary, COPP.

Copy, with a copy of the enclosure, forwarded for information to:

(1) Chief Secretaries of all other State Governments/Administrations.

(2) Secretaries of all the Union Ministries.

(3) Leader of the Team.

(4) Members of the Consultative Committee.

(5) Standard Distribution in Planning Commission.

By order, etc.

(K.N. Butani)
Officer on Special Duty,
Committee on Plan Projects.

ANNEXURE

COMMITTEE ON PLAN PROJECTS

Terms of Reference of the Team for the study of Chambal and Lakkavali (Bhadra) Irrigation Projects.

The Terms of Reference of the Team will be as follows:-

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to:

(a) Utilisation of trained personnel and materials;

(b) Utilisation of machinery and equipment;

(c) Construction Plant lay-out;

(d) Adequacy of original estimates and designs as evidenced from actual construction of the project;

(e) Phasing of construction with a view to studying whether

(i) timely utilisation of benefits accruing from the Project has been ensured;

(ii) it is possible to accelerate accrual of benefits;

(iii) benefits could be increased by re-phasing the project at this stage;

(f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

(g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the Project.

CHIEF SECRETARY
NO.....
11 FEB 1957
GOVERNMENT OF MYSORE

No.COPP(1)/5/57.
Committee on Plan Projects
Planning Commission,

Reserve Bank Building,
Parliament Street,
New Delhi.

New Delhi,
February 7, 1957.

From

Shri Indarjit Singh,
Joint Secretary, Finance and
Secretary, Committee on
Plan Projects.

To

The Chief Secretary,
Govt. of Rajasthan, Jaipur.
Govt. of Madhya Pradesh, Bhopal.
Govt. of Mysore, Bangalore.

Subject: Organisation of investigations into Irrigation and Power Projects by the Committee on Plan Projects.

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3. The Leader of the teams for the both the Projects will be Shri N.V. Gadgil, M.P. The Consultative Committee

-/-

to advise him would consist of the following:

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2. Shri N.N. Iengar, Adviser, Tata Power Co., ~~Consulting Engineer in the Iron & Steel Industry~~.

3. Shri Thirumale Iyengar, Chief Engineer, Hirakud.

4. Shri R.K. Gupta, Managing Director, National Projects Construction Corporation.

A person with experience of Works Accounts and finance may be invited to serve on the Consultative Committee later.

4. The names of the members of the Team will be intimated shortly. It is requested that the necessary facilities may be given to the Consultative Committee and the Team for the study of the Projects.

Yours faithfully,

(Indarjit Singh)
Joint Secretary, Finance
&
Secretary, COPP.

Copy, with a copy of the enclosure, forwarded for information to:

(1) Chief Secretaries of all other State Governments/Administrations.

(2) Secretaries of all the Union Ministries.

(3) Leader of the Team.

(4) Members of the Consultative Committee.

(5) Standard Distribution in Planning Commission.

By order, etc.

(K.N. Butani)
Officer on Special Duty,
Committee on Plan Projects.

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(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to:

(a) Utilisation of trained personnel and materials;

(b) Utilisation of machinery and equipment;

(c) Construction Plant lay-out;

(d) Adequacy of original estimates and designs as evidenced from actual construction of the project;

(e) Phasing of construction with a view to studying whether

(i) timely utilisation of benefits accruing from the Project has been ensured;

(ii) it is possible to accelerate accrual of benefits;

(iii) benefits could be increased by re-phasing the project at this stage;

(f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

(g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the Project.

PWD 68 BRPS 57

7

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

No. PWD 68 BR RPS-57 Dt-20-2-57

Sub:- Organisation of Investigations into Irrigation and power projects by the Committee on flow projects — Inspection of Bhadra project by Committee on flow projects —.

To

(1) The Chief Engineer Major Irrigation (S) Bangalore.

(2) The Chief Engineer Electricity B'lore

Sir,

I am directed to forward herewith a copy of letter No Copp (1)/S/57 dt Feb 7, 57 and a copy of its enclosure, received from the Joint Secy Finance and Secy, Committee on flow projects, planning Commission New Delhi Govt. regarding the

WD 0258—GPB—PZS-1,20,000—1-7-55.

D

the above subject and to request that the new facilities may be given to the Consultative Committee and the team for the study of the Bhadra project.

In the meantime, a comprehensive report ~~[illegible]~~ to be furnished to the team on its arrival, as per the terms of reference of the team, as indicated in the annexure, may be forwarded for the information of Govt., with in a week's time.

I am to add that all ~~the~~ possible information ~~[illegible]~~ ~~[illegible]~~ that the team is likely to ask, at the time of its inspection, should be kept ready and furnished ~~[illegible]~~ ~~[illegible]~~ to the team.

4/F

KR 18/2/1977

for Secy to Govt. P.I.C.

P.T.O.

10

Telephone No. 2110
Telegraphic Address: "GOMED"
In Reply Refer to
No. 79179
Enclo.
CODES USED:
BENTLEY'S LIEBER'S
A. B. C. 6th EDITION
BUSINESS TELEGRAPH CODE

MYSORE GOVERNMENT SECRETARIAT
No. Secy
22 FEB 1957
(S.S)
PUBLIC WORKS

GOVERNMENT OF MYSORE
ELECTRICITY DEPARTMENT

OFFICE OF THE
CHIEF ENGINEER, ELECTRICITY
Post Bag No. 15

Bangalore-1, 22 Feb. 1957
(Mysore, S. India)

SECRETARY TO GOVERNMENT
Date 23/2/57
PUBLIC WORKS & ELEC DEPTS.

The Secretary to Government,
Public Works Department,
BANGALORE.

MYSORE GOVERNMENT SECRETARIAT
NO. 5642
26 FEB 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Sir,

Sub: Organisation of investigations into Irrigation & Power Projects by the Committee on Plan Projects - Inspection of Bhadra Project Committee on Plan Projects.

=======

With reference to your letter No.PWD.68-BRP-57 dated the 20th February 1957, I write to state that the administrative set-up at Lakkavalli is under the immediate direction of the Special Chief Engineer for Major Irrigation (South) and the Superintending Engineer (Civil), and as such necessary facilities for the team on arrival at Lakkavalli will have to be given by either of these two officers.

The terms of reference of the team as per annexure concern principally with Civil Engineering works as well as water rates, betterment fees, etc., which aspect the Special Chief Engineer for Major Irrigation (South) will be able to compute and keep ready for reference at the time of the team's arrival.

As far as this department is concerned, the construction programme, utilisation of trained personnel, the phasing of construction and such matters that pertain to the department will be got ready for reference, if any, by the team.

Yours faithfully,

(J.L.D'Sa),
Chief Engineer, Electricity.

MYSORE PUBLIC WORKS DEPARTMENT

No. 83 / 24-2-57.
Encls.

MYSORE GOVERNMENT SECRETARIAT
No. Secy
26 FEB 1957
(MIS)
PUBLIC WORKS BRANCH

Office of the Superintending Engineer,
Thungabhadra Valley Circle,
B.R.P. Post (via. Birur)

Dated .....

To

The Secretary to Government,
Public Works Department, Bangalore-1.

SECRETARY TO GOVERNMENT
Date 28/2/57
PUBLIC WORKS

Sir,

Regarding Organisation of Investigation into Irrigation and Power Projects by the Committee on Plan Projects - Inspection of Bhadra Reservoir Project by the Committee on Plant Projects.

MYSORE GOVERNMENT SECRETARIAT
NO. 558
28 FEB 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

****

With reference to your letter No. PWA 68/BRP/57 dated 20th February 1957, forwarding a copy of letter of even Number and date, addressed to ~~you on~~ the Chief Engineer, Major Irrigation (South), Bangalore, on the above subject, for furnishing a report on the terms of reference of the Team for the study of Chambal and Lakkavalli (Bhadra) Irrigation Projects, I write to inform you that I have to-day forwarded to the Chief Engineer, M.I. a comprehensive report with necessary statements touching on all the points contained in the terms of reference of the Committee.

Yours faithfully,

(R.L. Raju)
Superintending Engineer,
Tungabhadra Valley Circle.

msl/23-2.(5171)

The main file has been submitted for the perusal of the Secy. The same may be awaited.

FJ) 7/3/57

12

GOVERNMENT OF MYSORE

No. PWD 68 BRP 57

Mysore Government Secretariat,

Dated, Bangalore: 20-3-195

FROM

The *Secretary to the Government of Mysore,*
Public Works Department, Bangalore.

To

The Chief Engineer,
Major Irrigation (South),
Bangalore.

Sir,

Sub:- Regarding Organisation of investigation into Irrigation and Power Projects by the Committee on Plan Projects - Inspection of Bhadra Reservoir Project by the Committee on Plan Projects.

Ref:- This Office No. PWD 68 BRP 57 Dt. 20-2-57.

I am directed to invite reference to the communication cited and to request you kindly to furnish the particulars already called for therein, immediately.

Yours faithfully,

20/2/57

(K.B. Murarappa),
for Secretary to Government,
Public Works Department.

Issued
20.3.57

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

No. PWD: 68 BRPS.57 dt 20.3.57

PWD 68 BRPS'57 13

Sub:- Regarding organisation of investigation into Irrigation and power projects by the Committee on plan projects - Inspection of Bhadra Reservoir project by the Committee on plan projects.

To

The CE M&I (S) Bangalore

Sir, Ref:- T.O. No. PWD 68 BRPS57 dt. 20.2.57.

I am directed to invite reference to the communication cited and to request you kindly to furnish the particulars already ~~etc~~ called for therein immediately

4/F

18/3/57

for Sec. to Govt. Govt. plan

18/3/57 18/3/57

Issued
20.3.57

No.COPP(1)/5/57
Committee on Plan Projects,
Planning Commission,
Reserve Bank Building,
Parliament Street.

New Delhi,
February 19, 1957.

From

Shri Dhani Ram, M.A.,
Under Secretary to the
Government of India.

To

The Chief Secretary,
Government of Mysore,
Bangalore.

Sub: Organisation of investigations into Irrigation and Power Projects by the Committee on Plan Projects.

I am directed to refer to this office letter of even number dated February 7, 1957 on the subject mentioned above and to say that Shri D.S. Borker has been appointed as Secretary to the Team and the Consultative Committee for Irrigation & Power Projects.

Yours faithfully,

(Dhani Ram)
Under Secy. to the Government of India.

Plan 21/2

Submitted for information

22/2/57

2) Where is the previous letter? It was sent copy to Secy PWD! 22.2.

3) It is learnt from the Registrar that ~~the file~~ 382 has been referred to Secy: P.W.D on 15/2/57. If the same may be referred to Secy: P.W.R. for information.

NB 22/2/57 in continuation

22.2.57 US. (Pub)

MIS 25 FEB

5-15

PUBLIC WORKS MAJOR IRRIGATION BRANCH

NVS. 22/3/57

4) The connected file on this, stated to have been referred to the Secy P.W.D on 15-2-57, at para 3 above, has not been received in this section as verified.

Hence this may be returned to the chief-secretariat for ~~sub~~ retransmission along with the file & may be referred to other sections for verification.

Comm.

5/3. Supt, ~~Sp.~~, may pl. see if this relates to his Br.

6/3/57

Not rec'd in Comm. Br.

TAV

MYSORE GOVERNMENT SECRETARIAT No. 864 PUBLIC WORKS (COMMUNICATION BRANCH)

Supt M.I

~~This may be returned to the Planning Dept. as the previous paper has not been rec'd~~

PWD 68 BPJ 57

15

Delhi file

SUBJECT:- MEETING OF THE COMMETTEE ON PLAN PROJECTS

MYSORE GOVERNMENT SECRETARIAT
No. 4411
21 FEB
PUBLIC WORKS MAJOR IRRIGATION BRANCH

I place below for the Chief Minister's perusal a brief note on the agenda of the ensuing meeting of the Committee on Plan Projects to be held at New Delhi on 7th December 1956.

Private Secretary to
Chief Minister

5. 12. 56.

OFFICE OF THE CHIEF MINISTER
No. 264
Date 5/12/56
6 P.M.

As this file is no longer required the same is herewith sent to Deputy Secy P.W. Dept.
An
14/4/57

17/2

MYSORE GOVERNMENT SECRETARIAT
13 FEB 1957
PUBLIC WORKS DEPT

Deputy Secy
P.W.D.

PWD 19/2/57

14/2

19/2

Major Irrigation

14/2

4.2.57

SUBJECT:- Meeting of the Committee on Plan Projects.

The following agenda for the ensuing meeting of the Committee on Plan Projects to be held at New Delhi on 7th December has been indicated:-

(1) A review of the work done by the Committee up till now;

(2) Proposal for the constitution of Investigation Teams for Irrigation & Power Projects; and

(3) Proposals for the implementation of the various functions of the Comittee.

From the agenda note on the first subject, it is seen that while the teams for investigating into community projects and projects of selected buildings are under formation, those for investigating irrigation and power projects, among which the Bhadra Project of Mysore is included, have not yet been constituted. A perusal of the note on the organisation of teams under Subject No.2 shows that such teams will be organised only after a Special Consultative Committee of four or five top engineers in the country makes a quick 'on the spot' studies of some of the projects and gives suggestions about the scope of work of the teams. The constitution of the Special Consultative Committee is as follows:-

(1) Shri. A.N.Khosla, Vice Chancellor, Roorke University

(2) Shri. N.N.Iengar, Electrical Adviser of Tatas

(3) Shri. M.S.Tirumale Iyengar, Chief Engineer, Hirakud

(4) Shri. R.K.Gupta, Retired Chief Engineer, Punjab.

It is to be gathered that approval of the Committee on Plan Projects will be sought for the constitution of the Committee at the ensuing meeting. While there can be no objection to the constitution of Committees such as the one referred to above, it would appear that the interposition of a Committee like this between the Committee on Plan Projects and the Teams

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It is to be gathered that approval of the Committee on Plan Projects will be sought for the constitution of the Committee at the ensuing meeting. While there can be no objection to the constitution of Committees such as the one referred to above, it seems would appear that the interposition of a Committee like this between the Committee on Plan Projects and the Teams

to be constituted for studying the irrigation and other projects is ~~both~~ unnecessary and is likely to prolong the work of the teams. After all, the points on which any particular team will have to conduct investigations in respect of ~~any~~ particular projects are fairly well-known and have been broadly indicated even in the agenda notes now circulated. The functions of the Consultative Committee are not very clearly defined and there seems to be little harm in dispensing with these committees.

As regards the functions of the Teams to be organised for the purpose of investigating Plan Projects, the note now circulated tells more about what such teams should not do than about what they should do. Apparently, a more precise definition of the work of the teams is proposed to be furnished only after the Consultative Committee referred to above gives its suggestions. If it is agreed that there is no need to constitute a Consultative Committee, it will become necessary to make the terms of reference of these teams clearer even now.

It has been made clear in the agenda note that the Teams will consist of experienced officers and such non-official gentlemen as are conversant with work relating to projects. It may be necessary in this connection to urge the inclusion of Members of Parliament or local Legislature in the team who will have local knowledge and who can bring to bear their knowledge on the work of the team. Among irrigation and power projects, Bhadra Project in Mysore has been specifically marked out for investigation. It would be appropriate to suggest that the team should consist of, say, a Member of Parliament from Mysore State and one or two members of the Legislature.

Information is sought on what other projects the States would suggest investigation by the Committee. The Tungabhadra Project on the Munirabad side is in progress and it might be desirable to secure an investigation of the work of this project by one of the teams. A suggestion may perhaps be made accordingly in the course of the deliberations of the Committee.

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Information is sought on what other projects the States would support investigation by the Committee. The Tungabhadra Project on the Kurnool side is in progress and it might be desirable to secure an investigation of the work of this project by one of the teams. A suggestion may perhaps be made accordingly in the course of the deliberations of the Committee.

With regard to other important projects in Mysore such as Sharavati and Ghataprabha, there does not seem to be any need for investigation just at present as these are still in the early stages of execution.

The other proposals made in the agenda notes about the procedure of the Committee on Plan Projects, procedure of the Teams and the criteria for revaluation, may perhaps be agreed to

Secretary to Government,
P. W. & Electrical Departments

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Secretary to Government,
P. W. D. Electrical Department

P.W.D. - Major Irrigation Section.

The File relating to the Functions of the Consultation Committee for Irrigation and Power Projects, in which the Chief Minister had approved a drft letter to Sri.V.T. Krishnamachari, was returned to the Chief Minister's Secretariat under instructions from the Deputy Secretary, on 13-3-1957 with Diary No. 882, for taking necessary action for the issue of the letter over the Chief Minister's signature after typing it in the Chief Minister's letter head. As the file has not yet been received back, the Private Secretary to the Chief Minister may kindly be reminded over phone.

MYSORE GOVERNMENT SECRETARIAT
NO. 1053
21 MAR 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

21/3/57

The private Secy to the CM has been reminded over phone today

(K. B. Nuraappa)
21/3/57
(As P.W.D.)

OFFICE OF THE CHIEF MINISTER
CHGR 108
No.
Date 21/3/57

For fo. weekly.

P.S to CM)

D/S.

The connected file is placed below.

Asst Secy
P.W.D)

25/3
Private Secretary.

M/S

KVS

26/3/57

As the D.O. letter is to be issued over the signature of the Chief Minister, it may kindly be arranged to be typed in the Chief Minister's letter head.

Secy
Chief Minister's Sect) Secy.
13/3/57

20

PLANNING COMMISSION
NEW DELHI

D.O. No. PC/DCH/ 10 /57

10th January 1957

OFFICE OF THE CHIEF MINISTER Date 14/1/57

To speak to Sri. H.K.V. & the Secretary Sri. D.K. Sivaram on 24/1/57 25/1/57 28/1/57

My dear Shri Nijalingappa,

Kindly refer to the minutes of the meeting of the Committee on Plan Projects held on 7-12-1956 regarding the organisation of a Consultative Committee and a Team for Irrigation and Power Projects. The personnel of the team is being finalised in consultation with Shri N. V. Gadgil. The functions of the Consultative Committee and the Terms of Reference have now been cleared with him and they are as contained in an Annexure to this letter. I shall be glad if you will kindly let me have your suggestions for any modifications that you may desire to indicate. It is proposed to hold a meeting of the Consultative Committee on the 19th instant at Bombay. Your reply may, therefore, kindly be sent before this date.

Yours sincerely,

V. T. Krishnamachari

Shri S. Nijalingappa,
Chief Minister,
MYSORE,
Bangalore.

This was discussed yesterday in the Chief Minister's chambers. A draft of a reply as from the Chief Minister is put up for his consideration in the light of the discussions held.

PS to CM) Draft approved. 25/1/57

Seen pce 12/3/57

640 Date 25/1/57

Seen (W.D.) 11/3/57

Annexure.

21

COMMITTEE ON PLAN PROJECTS

Subject: Functions of the Consultative Committee for Irrigation & Power Projects and Terms of Reference of the team for the same purpose.

Functions of the Consultative Committee.

The main function of the Consultative Committee is to evolve the outline of a method that should be followed in conducting investigations of Irrigation Projects. The Committee will give technical advice to the leader of the team on this question after an "on the spot" visit to the project for about a week or 10 days. Shri Kanwar Sain thought that this period was enough to enable the members of the Committee to draw up the outline of a plan for investigation. The actual investigation will then be conducted by the leader of the team assisted by an appropriate team which should include a person with long experience of Works Finance.

2. The Consultative Committee will also be available to the leader of the team for such consultations as he may like to hold with them on important questions that may arise during the course of the conduct of investigations. As members of the Committee are busy people otherwise, a claim should be made on their time only if it is considered absolutely necessary in public interest.

3. The leader of the team may preside over the meetings of the Consultative Committee and settle the procedure to be followed in convening and conducting meetings. The Committee should normally meet at the site of the project concerned otherwise at the headquarters of the team.

4. The Consultative Committee should be supplied with a detailed note on each project with relevant documents such as sanctioned Estimate & Project Report, Quarterly Progress Reports, Construction Programme and Schedule, Schedule of Rates etc. The Committee will have the authority to call for such other material as it may consider necessary.

Terms of Reference.

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to:

(a) Utilisation of trained personnel and materials;
(b) Utilisation of machinery and equipment;
(c) Construction Plant lay-out;
(d) Adequacy of original estimates and designs as evidenced from actual construction of the Project;
(e) Phasing of construction with a view to studying whether -
  (i) timely utilisation of benefits accruing from the Project has been ensured;
  (ii) it is possible to accelerate accrual of benefits;
  (iii) benefits could be increased by re-phasing the Project at this stage.

.....2

MYSORE GOVERNMENT SECRETARIAT
NO. 882
12 MAR 1957
PUBLIC WORKS BRANCH
SECRETARY TO GOVERNMENT
1182
Date 12/3/57
PUBLIC WORKS - IRRIGATION
MYSORE GOVERNMENT SECRETARIAT
NO. 882
13 MAR 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

(i) Satisfactory or, if stipulations concerning the planning stage with a view to the formulation of projects;

(j) The effect of the above study on the financial results of the project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of increasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the project.

(f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

(g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the Project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the Project.

CH 2318 23

13th March, 1957.
14

My Dear Shri Krishnamachari,

Kindly refer to your D.O. letter No.PC/DCH/10/57 of 10th January about the organisation of a Consultative Committee and Teams for Irrigation and Power Projects as decided by the Committee on Plan Projects. I am sorry a reply could not be sent before the date mentioned in your letter, nor earlier than this as we were all very busy with the General Elections without rest.

2. I have gone through the annexure sent with your letter and particularly the terms of reference to the Consultative Committee. I am generally agreeable to the proposals contained in the annexure but would refer to one or two aspects of the question which have to be kept in view with particular reference to Bhadra Project which is one of the projects that are going to be investigated.

3. In Mysore we have what is called a Standing Technical Advisory Committee consisting of serving Chief Engineers and a few eminent retired Chief Engineers. This committee scrutinises the estimates for projects, conducts inspections and tenders advice on technical matters pertaining to the execution of projects. It is desirable that the work of this committee is taken note of when the Consultative Committee and the Investigation Team look into the working of the Bhadra Project.

4. Secondly, I wish to recall the suggestion I made during the last meeting of the Committee on Plan Projects to the effect that the Investigation Team should consist among others, of one or two leading local people with knowledge of local conditions and experience of the kind of work that is being done. I would reiterate that suggestion for consideration in connection with the constitution of the Team. I take it that the Team has not yet been constituted and will be brought into existence after the Consultative Committee concludes its work. I presume also that we will be consulted in the matter of the constitution of the Team.

5. Lastly, I would invite attention, generally with reference to the scope of the Consultative Committee's work, to paragraph 8 of the Agenda Note on the Review of the work done by the Committee on Plan Projects, which was circulated at the time of the last meeting, and to the preliminary observations of the Chairman of the Committee about the role of such Consultative Committees and Investigation Teams. I feel that while an investigation in these cases would be welcome and would even be necessary, no impression would be allowed to be created that details of the work are being directed from time to time by a superimposed agency. That may prove to be unhealthy. I am full of hope, however, that under the guidance of the present Consultative Committee, presided over as it is by a person of the eminence of Sri N. V. Gadgil and with the membership announced already, no occasion for any such feeling will arise.

Yours sincerely,

(Sd)
(S. NIJALINGAPPA).

Shri V. T. Krishnamachar,
Deputy Chairman,
Planning Commission,
Government of India,
NEW DELHI.

True copy
14/3

smk

My Dear Shri Krishnamachari,

Kindly refer to your D.O.letter No.PC/DCH/10/57 of 10th January about the organisation of a Consultative Committee and Teams for Irrigation and Power Projects as decided by the Committee on Plan Projects. I am sorry a reply could not be sent before the date mentioned in your letter as we were all very busy with the general elections without rest. not earlier than this

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25

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Yours sincerely,

(CHIEF MINISTER)

Chief Minister's Office Functions of the Consultative Committee for Irrigation
Continuation Sheet. File No. and Power Projects. Page

Letter No. CH 2318 dated 14/3/57 issued to Sri. V.T. Krishnamachar, Deputy Chairman, Planning Commission, New Delhi.

14/3

PWD 68 BRPS 57 27

App ,dix F. G.—1]

SUBJECT Organisation of Investigation into Irrigation and power projects by the Committee on Plan Projects

Diary No. of letter replied to

Mysore Government Secretariat.

( )

the 19

Date of issue

Signed by

List of enclosures

Copied by

Issued

Examined by

Section

File No.

Serial No.

No. PWD 68 BRPS 57 Dt. 28.3.57

To

The CE & S B'lore

Sir

In continuation of this office letter No PWD 68 BRPS 57 dt. 20.2.57, I am directed to forward herewith a copy of letter No. C.opp (1)/5/57 dt 19th Feb 57 received from G.o.g. for information. The particulars called for in the letter referred to above may kindly be furnished immediately

4/F

28/3/57

for Sec to Govt PWD

WD 03736-GPB—P.Z.S.— 50,000—1-3-56

25/3/57

GOVERNMENT OF MYSORE

No. P.W.D. 68 BRP 5

Mysore Government Secretariat,

Dated, Bangalore 28.3.1957

FROM

The Secretary to the Government of Mysore,
Public Works Department, BANGALORE.

To

The Chief Engineer,
Major Irrigation (South)
Bangalore.

Sir,

Sub:- Organisation of Investigation into Irrigation and Power Projects by the Committee on Plan Projects.

~~Sir,~~

In continuation of this office letter No. PWD 68 BRP 57 dated 20-2-1957, I am directed to forward herewith a copy of letter No. COPP (1)/5/57 dated 19th February 1957 for information. The particulars called for in the letter referred to above may kindly be furnished immediately

Yours faithfully,

(K.B. Murarappa),
for Secretary to Government,
Public Works Department.

GOVERNMENT OF INDIA
MINISTRY OF IRRIGATION AND POWER

No. 32(1)/56-Policy Dated New Delhi the, 25th March, 1957.

From

Shri T. Sivasankar, I.C.S.,
Secretary to the Government of India,

To

The Secretary to the Government of Mysore, Public Works Department, Bangalore.

Subject:- Enquiries by the Teams constituted by the Committee on Plan Projects.

Sir,

I am directed to invite your attention to the terms of reference of the Teams that have been constituted by the Committee on Plan Projects for the study of the Chambal and Lakkavalli Projects under the Leadership of Shri N.V. Gadgil. One of the objectives of organising the Teams was to make available to the two projects the experience gained on analogous problems in other projects. It will be necessary for the Team, therefore, to obtain comparative data from some of the important projects that have been or are in the process of being completed in different States. The projects from which such data may have to be gathered are indicated in the margin. The names of the Members of the Team and their present addresses are mentioned below:-

1. Hirakud.
2. Bhakra Nangal.
3. Damodar Valley Corporation.
4. Rihand Dam.
5. Tungabhadra.
6. Nagarjunasagar.

1. Shri M. Narasimhaiya,
   Chief Engineer (Retd.)
   C/o Chief Engineer, Chambal Project,
   Chambal Hydel Works P.O.,
   Madhya Pradesh.

2. Shri C.L. Handa, I.S.E.,
   73-74, Sundarnagar,
   New Delhi.

3. Shri G.N. Pandit, I.S.E.,
   Circuit House,
   Shimoga (Mysore).

2. It is not proposed to set up a large scale organization to assist the Teams in their studies as the intention is that any assistance they may need in connection with their studies should be obtained either from the Project authorities or from such other specialised agencies as have already been constituted at the Centre

.....

30

and in the States. The work to be done by the Members of the Team will also encompass different aspects of designing, planning and construction and it is not likely that the assistance provided by attaching one or two engineers, however experienced, to the Team would be diversified enough for the allotted tasks. As the Committee on Plan Projects is an organization under the auspices of the National Development Council, it is appropriate that both the Centre and the States should render such assistance as they can to the Teams constituted by it. It is possible that the Members of the Team may have to refer some specialised problems for solution to agencies which are mentioned in the margin. I shall be grateful if you can kindly request the authorities in charge of the projects/research stations to supply to the Members of the Team promptly such information and data as they may consider relevant to their enquiries.

1. Central Water and Power Research Station, Poona.
2. Irrigation & Power Research Institute, Amritsar.
3. Hirakud Research Station, Sambalpur.
4. U.P. Irrigation Research Institute, Roorkee.

Shri S. Venkataraman, Deputy Secretary in this Ministry, has been nominated for liaison work in this connection and may be contacted whenever necessary. On their part, the Members of the Team will invoke the arrangements suggested above only in exceptional circumstances, i.e., when the task is manifestly beyond the control of the staff and equipment made available to them. The head of the project or of the agency whose assistance is sought will be consulted before hand in such cases.

3. The cooperation of the Government of Punjab etc. in the matter will be appreciated.

Yours faithfully,

T. Sivasankar

(T. SIVASANKAR),
Secretary to the Government Of India.

COMMITTEE ON PLAN PROJECTS

Terms of Reference of the Team for the study of Chambal and Lakkabali (Bhadra) Irrigation Projects.

The Terms of Reference of the Team will be follows:-

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to:

a) Utilisation of trained persnnel and materials;

b) Utilisation of machinery and equipment;

c) Construction Plant lay-out;

d) Adequacy of original estimates and designs as evidenced from actual construction of the project;

e) Phasing of construction with a view to studying whether

i) timely utilisation of benefits accruing from the Project has been ensured;

ii) it is possible to accelerate accrual of benefits;

iii) benefits could be increased by rephasing the project at this stage;

f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the Project.

PWD 68 BRP 57 (32

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

No. PWD 68 BRPS) dt 2/4/57

Sub:- organisation of investigation into Irrigation and power projects by the Committee on flow projects - Enquiries by the Teams constituted by the Committee on flow projects -

~~Ref~~

Sir, - Ref:- Govt's letter No

1) PWD 68 BRP 57 dt 20.2.57

2) PWD 68 BRP 57 dt 28.3.57.

To

1) The Chief Engr. N.I. (S) Bly

2) ~~The Chief Engr N.I. (N) Raichur Dist~~

In continuation of the letters cited, I am directed to forward herewith a copy of letter No. 32(1)/56 - policy dt 25th March 1957 along with a copy of its enclosure received from the Secretary to G.O.I. Ministry of Irrgn & power regarding the above sub

WD 0258—GPB—PZS-1,20,000—1-7-55.

33

and to request you kindly to supply to the members of the team promptly, such information and data, as they may consider relevant to their enquiries -

Y/F

29.3.57

for Secy to Govt
pro

29/3/57 29/3/57

Issued
2/4/57

Copy to SE TVC for
info & compl.

29.3.57
Secy to Govt

Issued
2/4/57

C. F. No. 461

GOVERNMENT OF MYSORE

No. 49/S
Encls.

OFFICE OF Chief Engineer, Major Irrigation—South, BANGALORE.

NO. M/S
6 APR 1957
PUBLIC WORKS BRANCH

Date 5-4-57

To

The Secretary to Government Of Mysore,

Public Works Department, BANGALORE.

Sir,

Sub:- Organisation of investigation into Irrigation and Power Projects by the Committee on plan projects - Inspection of Bhadra Project by the Committee on plan project.s

---

With reference to your letter No.PWD.68/BRP/57 dated 20-2-57, I write to forward herewith the marginally noted particulars in eight sets for forwarding one set each to each of the 5 members and 3 copies to Secretary of the Consultative Committee to ~~train~~ Team of Engineers.

1. a. Estimate for Rs 888 lakhs.
   b. -do- 1775 "
   c. -do- B.R.H.E.Project,
2. B.R.P.Reports
3. Notes on the terms of reference of the Committee on Plan Projects constituted by Govt. of India.

This disposes off your reminders. P.W.D.68/BRP/57 dated 20-2-57 and PWD.68/BRP/57 of 28-3-57.

MYSORE GOVERNMENT SECRETARIAT
NO. 1548
9 APR 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Yours faithfully,

(T.Ramaswamy Iyengar)
Chief Engineer,
Major Irrigation-South.

bvb

35

MYSORE PUBLIC WORKS DEPARTMENT

MYSORE GOVERNMENT SECRETARIAT
NO. MS
18 APR 1957
PUBLIC WORKS BRANCH

Office of the Superintending Engineer
Tungabhadra Valley Circle,
B.R.P. Post (via. Birur)

No. G. 1
Encls.

Dated 17/4/57

To

The Secretary
to Government of Mysore,
Public Works Department, Bangalore-1.

WUS

Sir,

MYSORE GOVERNMENT SECRETARIAT
NO. 1802
18 APR 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Regarding organisation of investigation into Irrigation and Power Projects by the Committee on Plan Projects - Enquiries by the Teams constituted by the Committee on Plan Projects.

With reference to your letter No. PWD/68/BRP/57 dated 2nd April 1957 on the above, calling for the necessary information therein, I write to state that the ~~revised~~ required information has already been sent to the Chief Engineer, Major Irrigation (South), Bangalore, in this office No.G.84 dated 24-2-1957.

Yours faithfully,

R.L. Raju

(R.L. Raju)
Superintending Engineer,
Tungabhadra Valley Circle.

msl/15-4.(94)

16/4/57

PWD 68 BRPS) 36

Appendix F. G.—1]

SUBJECT Organisation of investigation into Irrigation and power projects by the Committee on flow projects. Study of Chambal and Lakkawalli (Bhadra) projects.

Diary No. of letter replied to .....

Mysore Government Secretariat.

( )

the 195 .

Date of issue.....

Signed by.....

List of enclosures .....

Copied by.....

Examined by .....

Section

File No.

Serial No.

No. PWD 68 BRPS) Dt- 17.4.57

To

1) Sri. A. N. Khosla, Vice Chancellor Roorkee University.

2) Sri. N. N. Iyangar, Adviser Tata Power Co. New Delhi

3) Sri. Tirumale Iyangar Chief Engineer Hirakud.

4) Sri. R. K. Gupta Managing Director: National projects Construction Corporation. New Delhi

5) Sri. B. S. Borker. Secretary to the Team and the Consultative Committee for Irrigation & power projects Planning Commission. New Delhi.

Sir,

37

Ref:- No Copp (1)/S/57 dt
7-2-1957.

With reference to letter cited from the Joint Secretary, Finance and Secretary, Committee on plan projects regarding the above subject, I am directed to forward herewith the marginally noted ~~procedure~~ ~~Set of~~ particulars of B.R.P. ~~Set of particulars~~ in 3 copies for information.

(*) pl type this in the letter addressed to the Govt of India

1. a. Estimate for Rs 888 lakhs
   b. do — " 1775 "
   c. — do — B.R.H.E. project.

2. BRP reports.

3. Notes on the terms of reference of the Committee on plan projects constituted by G.O.I.

4/F

17/4/57
for Secy to Govt
pld.

Copy of the above is forwarded to CE Irrig (S) Bangalore w.r.t his No 49/S dt 5.4.57.

~~Three~~ Five more sets of the above particulars may kindly be ~~forwarded~~ sent immediately for being forwarded to the members of the Team constituted by the G.O.I.

17/4/57
for Secy to Govt.

GOVERNMENT OF MYSORE

Mysore Government Secretariat,

No. PWD.CO.DMP 57

Dated, Bangalore, 17th April 1957

ENDORSEMENT

From
The Secretary to Government,
Public Works Department, Bangalore.

To
(1) Sri.A.N. Khosla, Vice Chancellor, Roorkee University.
(2) Sri.N.N.Iyangar, Adviser, Tata Power Co. New Delhi.
(3) Sri.Tirumale Iyengar, Chief Engineer, Hirakud.
(4) Sri.R.K.Gupta, Managing Director, National Projects Construction Corporation, New Delhi.
Cir.(5) Sri.D.S.Borker, Secy.to the Team and the Consultative Committee for Irrigation & Power Projects, Planning Commission, New Delhi.

Sub:- Organisation of investigation into Irrigation and Power Projects by the Committee on plan Projects- Study of Chambal and Ichhavalli (Chedro) Project.

Ref:- No.COOP (1)/3/17 dated 7-2-1957.

With reference to letter cited from the Joint Secretary, Finance and Secretary, Committee on Plan Projects regarding the above subject, I am directed to forward herewith the originally noted particulars in 5 copies for information.

1. a. Estimate for the 600 Mkhs.
   b. Estimate for the 1775 Mkhs.
   c. Estimate for Chedro Reservoir Hydro Electric Project.
2. Chedro Reservoir Project Reports.
3. Notes on the terms of reference of the Committee on Plan Projects constituted by Government of India.

Yours faithfully,

Sd/-

(B.D. [illegible]),
for Secretary to Government,
Public Works Department.

Issued
17.4.57
No. PWD.66RRPS-57.
17-4-57

Copy of the above is forwarded to Chief Engineer, Major Irrigation (South), Bangalore with reference to his No. 49/S dated 5-4-1957. Five more sets of the above particulars may kindly be sent immediately for being forwarded to the members of the Team Constituted by the Government of India.

17.4.57

17.4.57

for Secretary to Government,
Public Works Department.

D.O.No. PC/COPP(4)/57

PLANNING COMMISSION
NEW DELHI

April 6, 1957.

My dear Nijalingappa,

I thank you for your letter No. CH.2318 dated the 13th March, 1957. I have shown your letter to Shri N.V. Gadgil, the Leader of the Team. He has fully endorsed your views and has assured me that the Consultative Committee and the Team are approaching the work in a spirit of helpfulness. There is no question of superimposing authority which should and continues to belong to the normal channels for the supervision of the project. The Consultative Committee and the Team will make available to the authority such experience and knowledge as they are capable of. On the other hand, the Team may gain valuable experience from your project for use elsewhere. The arrangement is for the purposes of ensuring a two-way traffic in the acquisition of knowledge regarding techniques employed for execution of projects. Shri Gadgil's presence is a guarantee that the work of the Team will be conducted in an atmosphere of goodwill and co-operation. You may be interested to read through a note recorded on the subject by Shri Gadgil, a copy of which I enclose.

Yours sincerely,

V. T Krishnamachari

Shri S.Nijalingappa,
Chief Minister, Mysore,
Bangalore-1.

Encl.

(COPY)

I have carefully gone through the letter No. CH2318 dated 13th March, 1957 from Shri Nijalingappa, Chief Minister, Mysore, a copy of which was sent to me. I think that there is something in Shri Nijalingappa's contention about the inclusion of some Member from the Local area. However, I think it will be enough to assure Shri Nijalingappa that cooperation of local authorities including Engineers and other technicians who are working on the project will be secured from every point of view.

As regards the psychological approach, it has already been decided in the Bombay meeting that the approach of the Team is not in the spirit of any fault finding or in a spirit of criticism, but the approach is constructive and nothing will be done which will create an atmosphere of distrust and every attempt will be made to create an atmosphere of friendliness. In fact, our approach to go to the help of the local authorities and make available to them such experience and technical knowledge as may be available to the Team as a whole from Members of the Consultative Committee who are in themselves men of outstanding merit.

Sd/-. N.V.Gadgil
25.3.57.

Sardar Inderjit Singh,
Secretary, COPP.

No.COPP/I&P/35/57
PLANNING COMMISSION
(Committee on Plan Projects)

Reserve Bank Bldg.(2nd floor)

IMMEDIATE

New Delhi, the 24th April 1957.

See
GOVERNMENT SECRETARIAT
26 APR 1957
PUBLIC WORKS BRANCH
SECRETARY TO GOVERNMENT
Date 26/4/57

GOVERNMENT SECRETARIAT
No. 2015
27 APR 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

The Secretary to Government,
Public Works Department,
Mysore Government Secretariat,
Bangalore.

Sir,

Sub: Irrigation & Power Projects Team - Study of Lakkavalli (Bhadra)Project.

I acknowledge with thanks the receipt of your Memo No.PWD 68 BRP 57 dated 17th April with enclosures.

I shall be grateful if four extra sets are sent for the use of the Members.

Thanking you,

Yours faithfully,

(D.S.Norker)
Secretary,Irrigation & Power
Team and Consultative
Committee.

Immediate.

PWD 68 BRP 57

42

Appendix F. G.—1]

SUBJECT: BRP — Inspection of Bhadra project — organisation of investigation into irrigation and power projects by the Committee on flow projects. Study of Chambal and Lakkavalli (Bhadra) projects —.

Diary No. of letter replied to .....

Mysore Government Secretariat.

( )

the 195 .

Date of issue.....

Signed by.....

List of enclosures .....

Copied by.....

Examined by .....

Section

File No.

Serial No.

No. PWD 68 BRP 57

To 3-5-57

Dear ~~Sir~~, Sri Ramaya Iyengar,

Ref: Govt's letter No PWD 68 BRP 57 dt 17-4-57

I am ~~desired~~ to invite reference to the Communication cited regarding the subject mentioned above, and to state that it has been intimated by the Irrigation & power Team and Consultative Committee, that another four ~~sets~~ ~~extra~~ sets of the particulars of the B.R.P are required for the use of the members.

Sir,

I am to request you kindly to expedite the forwarding of the above particulars in five sets as already called for in the letter cited. The matter may be kindly treated as extremely urgent, ~~and the particulars sent at once~~.

Yours faithfully,
30/4/57
(D/S. P.Ms)

To.

The CEO (S) (Bgnore)
B'lore

29/4/57

44

MYSORE GOVERNMENT SECRETARIAT,

D. O. No. PWD 68 BRPS-57 Dated Bangalore, 27 May 1957

Subj – As in PWD.

DEAR SIR,

I am desired to invite your attention to this Office Letter No. PWD 68 BRPS-57, dated 17-4-57 and the subsequent reminder no PWD 68 BRPS-57 dt 25/5/57 ~~reminders,~~ on the above subject ~~and~~

and to request that reply thereto may kindly be ~~expedited, as the matter is long pending~~) furnished immediately.

Yours sincerely,

To

Secy. PWD (S)

(By name)

Ans 25-5-57

Dy Secy.

Issued

ANP 27.5.57

WD 05438—GPB—8,000—5-11-56

Sri G.Krishnaswamy, B.E.,
~~SRI T. RAMASWAMY IYENGAR, B.A., B.E.~~
Chief Engineer, I/C.
Major Irrigation—South.

CENTRAL OFFICES,
PUBLIC WORKS DEPARTMENT,
Dated, Bangalore, the 30 May 1957.

MYSORE GOVERNMENT SECRETARIAT
NO. 3696
30 MAY 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

D. O. No. 50/S

Dear Sri Murarappa

With reference to D.O. No.PWD.68/BRP.57 dated 3-5-1957 and D.O.No.PWD.68/BRP.57 dated 27-5-1957 I am to request you kindly to send a copy of Government letter No.PWD.68/BRP.57 of 17-4-1957 as the same is not traceable in this office. The requisite information will be forwarded on receipt of the Government letter.

Yours sincerely,

(G.Krishnaswamy)

Sri K.B.Murarappa, B.E.,
Assistant Secretary to Govt.,
Public Works Department,
Bangalore.

MBT.29.5.

Appendix F. G.—1]

SUBJECT: Organisation of investigation into Irrigation and Power projects – Study of – Chambal and Lakkavalli (Bhadra Projects)

Diary No. of letter replied to .....

Mysore Government Secretariat.

( )

the 195 .

Date of issue .....

Signed by .....

pages 38/cs.

List of enclosures .....

Copied by .....

Issued

Examined by 6/6/57

Section

File No.

Serial No.

No. P(W) 68 BRPS 57 6-6-57

To

The C.E.M.I. (S). Bangalore

Dear Sir,

Ref. Your letter No. 50/S dt 30.5.57.

I am ~~directed~~ desired to enclose herewith a copy of letter No. P(W) 68 BRPS 57 dt 17.4.57 as desired by you and to request you kindly to send five more sets of particulars as called for therein immediately, for being sent to Govt of India.

Yours faithfully,

6/6/57

for Secy to Govt (W.R.)

Dear Sri. Gadgil,

Re: Draft report on Lakkavalli project.

Sri. M. Narasimhaiah handed over to me on 22.8.87, a copy of the draft report on the Lakkavalli project prepared by your team. I acknowledge the same with thanks. I am also grateful to you and your colleagues for the keen interest they have taken in this project. In general, this Govt. agree with the views contained in the report. The points raised and the suggestions made in the report will be considered and decisions taken in due course. I shall be again addressing, ~~after consultation~~ definite views asked for from the project authorities concerned. The ~~etc~~ 8th chief engineer (Sri ~~[illegible]~~) has received. Thanking you and with kind regards yours sincerely

(H.K.V)

Sri N.V. Gadgil.
Leader of the Irrigation & Power Team,
Committee on plan Projects,
Plang. Commission,
G.O.I. NEW DELHI

29.8.87

H. K. VEERANNA GOWDH
Minister for Public Works.

No. 750.

BANGALORE,
Dated 3rd Sep. 195 7

Dear Shri Gadgil,

RE:- Draft report on Lakkavalli Project.

Shri M.Narasimhaiah, handed over to me on 22-8-1957, a copy of the draft report on the Lakkavalli Project prepared by your team. I acknowledge the same with thanks. I am also grateful to you and your colleagues for the keen interest they have taken in this Project. In general, this Government agree with the views contained in the report. The points raised and the suggestions made in the report will be considered and decisions taken in due course. I shall be again addressing regarding the subject after certain details I have asked for from the Special Chief Engineer (~~North~~ South) are received.

Thanking you and with kind regards,

Yours sincerely,

Shri N.V. Gadgil,
Leader of the Irrigation & Power Team,
Committee on Plan Projects,
Planning Commission,
Government of India,
NEW DELHI.

Sri. G. Krishnaswamy, B.E.,
Deputy Chief Engineer, i/c
Major Irrigation—South.

Central Offices,
Public Works Department,

49

Bangalore, dated 12/9/ 195 7.

D. O. No. 142/S
2 copies of stepped up programme
1 copy of Stt

Dear Shri Murarappa,

As desired by you over phone, I enclose herewith two copies of stepped up Programme of Bhadra Reservoir Works and one copy of Statement showing the minum of Foreign Exchange required for Tunnel Works.

MYSORE GOVERNMENT
NO. 6131
12 SEP 19
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Yours sincerely,

12/9

Shri K.B.Murarappa, B.E.,
Under Secretary to Government,
Public Works Department,
BANGALORE.

bvb.12.9

S. H.V.S

12/9/57

H.K. Veeranna Gowda,
Minister for P.W. & Electricity,
Bangalore.

50

Mysore Government Secretariat,
Bangalore, dated, Sept. 1957.

D.O. No. ~~PWD~~ MPW. 789 dt 26-9-57

Dear Shri Gadgil,

Sub:- Draft Report on Lakkavalli Project.

I hope you are in receipt of my previous D.O. letter No.MPW 750 dated 4-9-1957 regarding the above subject.

One of the most urgent works that need immediate attention of this Govt., as pointed out by the team, is the execution of the two and a half mile long tunnel for taking the Right Bank Channel across a range of hills. The ~~Major~~ major portion of the irrigation ~~included in~~ under the project is in the command of the Malabennur and Davangere branches, which take off from the Right Bank Channel, beyond the tunnel. Hence, unless the tunnel is completed expediously, the development of irrigation under the Bhadra project will get seriously affected. As opined by the team, speedy execution of this tunnel has, therefore, become a matter of ~~the~~ most urgent importance.

This Govt., after considering all the aspects, have decided that the execution of the Tunnel works, must be done departmentally. The total ~~work~~ cost of the machinery and equipment which are required for this purpose, is estimated to be about Rs.39 lakhs. In order to secure such equipment as may be available in the Country, a team of Engineers was deputed to Bhakra-Nangal project for selecting our requirements from the equipment available there and surplus to that project, Necessary firm orders for the release of such of the machinery ~~that are~~ as is

required by us, have also been placed with the Bhakra-Nangal authorities. But, we still require some more machinery for the execution of the tunnel works and the statement of such machinery is enclosed herewith. The total cost of this machinery is about Rs.21 lakhs and the release of foreign exchange to this extent, which is the absolute minimum, has become inevitable.

This Govt. have also proposed to step up the tempo of work on Bhadra Project, so as to complete it by 1960-61, i.e. within the end of the Second Plan Period. A statement of expenditure programme proposed during the remaining part of the Second Plan period is enclosed herewith for your perusal. From the statement, it can be seen that an outlay of Rs.300 lakhs is expected to be ~~spent~~ incurred during the current year, and Rs.448.13 lakhs, Rs.400 lakhs and Rs.250.00 lakhs, during the subsequent three years of the Second Plan period, respectively. Hence, this Government requires sanction of additional ~~grants~~ funds ~~by~~ from the Centre ~~for~~ to step up the tempo of work, ~~as per~~ according to this programme.

I, therefore, request you kindly to use your good offices for the release of foreign exchange to the extent of Rs.21 lakhs required by us for the purchase of machinery for the execution of tunnel works, and also to the grant of additional assistance from the Centre, so as to enable this Government to complete this project within the end of the Second Plan period, ~~as per the proposed programme.~~

With kind regards,

(H.K.V.)

To
Sri N.V.Gadgil,
Leader of the Irrgn.& Power Team,
Committee on Plan Projects,
Planning Commission,
Government of India, NEW DELHI.

MPW-790 dt 26.9.57

Copy to C.E.(M.I.S) for information.

H. K. VEERANNA GOWDH
Minister for Public Works.

MPW. 789

BANGALORE,
Dated. 26th. Sep. ..1957.

51

Dear Shri Gadgil,

SUBJECT:- Draft Report on Lakkavalli Project.

I hope you are in receipt of my previous D.O. letter No.MPW.750, dated 4-9-1957 regarding the above subject.

One of the most urgent works that need immediate attention of this Government as pointed out by the team, is the execution of the two and a half mile long tunnel for taking the Right Bank Channel across a range of hills. The major portion of the irrigation under the project is in the command of the Malabennur and Davangere branches, which take off from the Right Bank Channel, beyond the tunnel. Hence, unless the tunnel is completed expeditiously, the development of irrigation under the Bhadra project will get seriously affected. As opined by the team, speedy execution of this tunnel has, therefore, become a matter of the most urgent importance.

This Government after considering all the aspects, have decided that the execution of the Tunnel works, must be done departmentally. The total cost of the machinery and equipment which are required for this purpose, is estimated to be about Rs.39 lakhs. In order to secure such equipment as may be available in the Country, a team of Engineers was deputed to Bhakra-Nangal Project for selecting our requirements from the equipment available there and surplus to that project. Necessary firm orders for the release of such of the machinery as is required by us, have also been placed with the Bhakra-Nangal authorities. But, we still require some more machinery for the execution of the tunnel works and the statement of such machinery is enclosed herewith. The total cost of this machinery is about Rs.21 lakhs and the release of foreign exchange to this extent, which is the

absolute.....

absolute minimum, has become inevitable.

This Government have also proposed to step up the tempo of work on Dhadra Project, so as to complete it by 1960-61 i.e. within the end of the Second Plan period. A statement of expenditure programme proposed during the remaining part of the Second Plan period is enclosed herewith for your perusal. From the statement, it can be seen that an outlay of Rs.300 lakhs is expected to be incurred during the current year, and Rs.600.13 lakhs, Rs.600 lakhs and Rs.700.00 lakhs, during the subsequent three years of the Second Plan period, respectively. Hence, this Government require sanction of additional funds from the Centre to step up the tempo of works according to this programme.

I, therefore, request you kindly to use your good offices for the release of foreign exchange to the extent of .71 lakhs required by us for the purchase of machinery for the execution of tunnel works, and also to the grant of additional assistance from the Centre, so as to enable this Government to complete this project within the end of the Second Plan period.

With kind regards,

Yours sincerely,

Shri N.V.Gadgil,
Leader of the Irrigation and Power Team,
Committee on Plan Projects,
Planning Commission,
Government of India, NEW DELHI.

MPW 790 dt 26-9-57

Copy to the Chief Engineer, Major Irrigation (South), for information.

REPORT TO ACCOMPANY THE STEPPED UP PROGRAMME FOR BHADRA DAM.

The Project Estimate for constructing a dam across Bhadrariver was administratively sanctioned for Rs.888.8 lakhs during 1946 for irrigating an extent of 1,80,000 acres and developing a Firm Power of 17,000 H.P. The preliminary works were commenced in the year 1947 with a view to complete the project in a period of ten years. But due to stringency of funds the State Government appointed a "Three-man Committee" during 1950 to investigate and report on the possibility of abandoning the Project. The Committee after study the details felt that the project should be continued in stages in stead of abandoning it completely. The Committee proposed a "(Programme according to which the dam was proposed to be built to level with necessary allied works. Works progressed as per th: "Go Slow" programme for Rs.252.00 lakhs till the end of Novembe: when the Central Loan of Rs.300.00 lakhs in addition to Rs.200.(of State Grant was made available for the first plan period. : then the works are being pushed through on a "Rush Basis" so as arrange to complete the project before end of Second Plan perioc Accordingly, the construction schedule was revised to what it st to-day as per the enclosed statement. Due to increase in cost labour and materials the original estimate was revised to Rs.177 lakhs and got administratively sanctioned in the year 1954. It now re-revised to Rs.2442.00 lakhs due to valid reasons. The e of irrigation under the Reservoir is increased from 1,80,000 acr 2,34,200 acres and the development of Firm Power from 17,000 H.P 35,600 H.P.

The construction of the Left Bank Channel for a length of miles has been almost completed except for some miscellaneous wo on the Main and Branch channels and shifting of villages. The was partly put into service on 25-7-1956 and for full length on 15-2

It is programmed to allow water in the Bhadra Reservoir Ri

Cha

Channel by June 1958 and the works have to be stepped up still further to keep to the schedule of construction for giving water supply.

In the statement of the year-war programme of works, it is proposed to complete the two major branch channels and the tunnel works by June 1961. For attaining this target, the Branch Channels will have to be taken up from now alone. According to the above phasing of construction to derive maximum benefits, a programme of expenditure during the Second Five Year Plan is drawn up from which it can be seen that annual expenditure for completion of works by the close of the Second Five Year Plan varies from Rs.250.00 lakhs to Rs.450.00 a year. Normally, at the present day condition, the progress that can be expected from a Division is Rs.40.00 lakhs a year. As such with the existing seven Divisions, a maximum progress of Rs.300.00 lakhs a year can be expected. So if the target of expenditure has to be attained every year, additional staff will be necessary with additional grants as noted in the accompanying statement.

At present, there is only one Survey and Designs Division working for the past 1½ years to finalise the surveys of the alignment of the Branch Channels beyond the tunnel. Final alignment of Malebennur Channel was approved by the Standing Technical Advisory Committee during its meeting on 10-7-1957 and arrangements are being made to start the work of the channel.

The Committee is considering the alternative alignments for Davangere Branch channel and a decision will be taken early. The total estimated cost of the Branch channels and other appertinent works beyond the Hiremalali Tunnel comes to Rs.501.50 lakhs. At the rate of Rs.40.00 lakhs for one Division per year, and to complete this work within next 3½ years i.e., by the close of the Second Plan period, three more Divisions are required to spend the balance amount of Rs.1398.13 lakhs.

An Index Plan of the project area showing thereon the proposed

Divisions

16
56

Divisions and the area that will line in their jurisdiction is also enclosed for information. A proposition statement for the establishment required is also appended for favour of approval.

In ~~the~~ case the above mentioned extra grants and extra staff are made available immediately, the Project canbe completed by the end of June 1961.

(R.L. Raju)
Superintending Engineer,
Tungabhadra Valley Circle.

msl/19-7.

SORE P.W.D.

STATEMENT OF EXPENDITURE PROGRAMME DURING THE S

Sl No.	Details of work.		Amount of Administratively sanctioned Estimate for 1775 lakhs.	Amount of Revised Est. now under submission for 2442 lakhs.	Exce lakh Ru
1.	Dam excluding power plant	..	554.08	799.00	25.
2.	Left Bank channel.	..	63.00	144.00	57.
3.	Right Bank channel-1st Section	..	415.00	531.00	116.
4.	Right Bank channel-2nd Section	..	231.00	295.00	79.
5.	Anvery Distributary	..	36.00	40.50	4.
6.	Malebennur Branch channel	..	80.00	106.00	26.
7.	Davangere Branch channel	..	212.00	325.00	112.
8.	Devarabilikere Pick-up	..	-	37.00	37.
9.	Sulekere tank and its improvements.	..	13.50	13.50	-
10.	Haraparahally Tail end distributary.	..	-	20.00	20.0
11.	Miscellaneous	..	10.00	1.00	-9.
			1615.00	2282.00	667.
	Electrical equipment.	..	160.00	160.00	
	GRAND TOTAL.	..	1775.00	2442.00	667.00

n.w.k.
19.7.57

TUNGABHADRA VALLEY CIRCLE

57

COND FIVE YEAR PLAN FOR BHADRA RESERVOIR WORK.

ss in s of ees.	Progres to end of March 1957.	Balance to be worked out during 2nd plan period.	1957-58	1958-59	1959-60	1960-61
2	467.21	331.79	100.00	80.00	80.00	71.79
0	79.94	34.06	15.00	19.06	-	-
0	295.32	235.68	85.00	80.00	70.68	-
0	38.67	256.33	30.00	95.67	82.32	48.34
0	0.60	29.30	10.00	29.90	-	-
0		106.00	30.00	35.00	25.00	16.00
0	2.13	322.87	30.00	80.00	110.00	102.87
	-	37.00	-	15.00	22.00	-
	-	13.50	-	13.50	-	--
	-	20.00	-	-	10.00	10.00
	-	1.00	-	-	-	1.00
	883.87	1398.13	300.00	448.13	400.00	250.00

(R.L.Raju)
Superintending Engineer,
Tungabhadra Valley Circle.

58

Tele:No.46762.

Shri N.V.Gadgil.

31,Ferozshah Road,
New Delhi.

Date: 13th September 1957.

My dear Shri Gowdh,

Many thanks for your letter No.MPW.750 dated the 3/4th September 1957. The Team is now finalising the Report and in due course it will be submitted to the Planning Commission. If you have anything further to communicate to the Team or to me, you can do so. I assure the Team will do every thing since it has found the entire work quite satisfactory.

Yours sincerely,

(N.V.Gadgil)

Shri H.K.Veeranna Gowdh,
Minister for Public Works,
Bangalore.

Draft Report on the Lakhwali Project.

(A)	Para 2(A) Suggestion for considering the maximum over-load capacity for the two River Bed generating units during final negotiations with the successful tenderer.	
(B)	Para 3(11) Examination of the question regarding the final sharing of the Tungabhadra Sators and joint regulation of Bhadra Reservoir and Tunga Reservoir to obtain if possible the optimum benefits for the Mysore State.	The Chief Engineer agrees that these two questions need urgent attention.
(C)	Para 4(A) & 4(13) Consideration of making the Standing Technical Advisory Committee compact. Proposal of the payment of reasonable remunera--tion to the Members of the Committee.	The Chief Engineer feels that the S.T.A.C. can be more compact similar to the Sharavati Tech. Committee and that a monthly suitable retainer is considered necessary.

(D) Para 5(3) Necessity for the formation of an additional Circle for supervision of the tunnel works and excavation of the Canals etc. beyond the tunnel.	The Chief Engineer has submitted a recommendation in this behalf.
(E)1 Para 5(6) Procedure of preparation of designs.	The practice is that the Chief Engineer even now issues basic design instructions to the Ex. Engrs. & he agrees to the proposal of a design cell.
(E)2 Para 5(7) Procedure of obtaining the results of model experiments at the Krishnarajasagar Research Station for the major projects such as Lakkavali, to be made expeditious.	Chief Engineer (General) agrees and suggests corrections (vide corrections in 5.7)
(E)3 Para 5(8)(a) Proposal for a laboratory.	A new laboratory has been constructed and action has been taken to post personnel, equip the laboratory for mortar and cement tests as also for soil tests on the field.
(E)4 Para 5(8)(b) Proposal for quality control Executive Engr.	Chief Engineer agrees with the proposal for a quality control Executive Engineer.
(F) Para 5(11) Appointment of an experienced store keeper at the dam site.	Chief Engr. proposes that a training centre for training Store keepers is an immediate necessity choosing First Dn.Clerks with a suitable

(G)	Para 5(14) Delegation of increased powers to the Chief Engr. & other officers.	Chief Engineer is of the opinion that this is an urgent necessity.
(H)	Para 6(3) Proposal for obtaining sufficient level in the spillway section so as to allow water in the Right Bank sluice for the Right Bank Canal one year earlier than the schedule.	The Chief Engineer has programmed to do this by June 1958.
(I)	Para 6(5) and 6(6) The programme of construction of tunnel and the canals so as to complete them in all respects by 1960-61.	The Chief Engineer has made all arrangements to see that if funds are made available the project gets completed by 1960-61 virtually.
	Approximate extent of funds required during the years 1957/58, 1958/59, 1959/60, & 1960/61.	3 crores 4 Crores each year. The Revised Estimate of works ~~being~~ under the jurisdiction of Chief Engr. amounts to ~~is~~ Rs.24 crores. (appx.)
(J)	Para 7(8) Standardization of Surkhi & Mortar ~~and~~	Chief Engineer agrees.

(K) Para 7(9) ~~Rxxxxxxx~~ Use of sand in Surkhi mortar.	Chief Engineer says that Surkhi earth at Lakkavali contains more of sand and additional sand would reduce strength.
(L) Para 7(11) Use of smaller stones for the downstream face of the spillway.	Chief Engineer does not agree with the suggestion. Further he says all stones have already been collected.
(M) Para 7(14) Specifications for R.C.C.	Chief Engineer says these suggestions have already been arranged to be adopted. Quality will be ensured according to standard practice.
(N) Para 7(15) Adoption of the masonry structures in place of R.C.C. on the canals.	This suggestion is noted.
(O) Para 7(18) Suggestion for the use of heavy earth moving machinery for other suitable works than at present.	This suggestion has already been adopted. Earth moving machinery has been shifted to Saddle Dam (Earth)
(P) Para 7(19) Suggestion to increase average daily progress of masonry.	Chief Engineer says it is entirely due to want of working space in an extremely short dam & that the targets will be attained.

(Q) Para 7(21) Suggestion to reduce the number of soil classifications on canal excavation.	Chief Engineer says that this is being examined with a view to reduce the number of classifications.
(R) Para 8(1) & 8(2) Equipment required for tunnel.	Full equipment as under 8.1 is not required all at once. This scheme will be kept in view and every effort made to secure economies.
(S) Para 8(4) Alternative alignment to cross Sulekere tank.	Chief Engineer has no remarks to offer.
(T) Para 9(12),9(13),9(14) & 9(15) Proposal for entrusting irrigation management to the Irrigation Department and a suggestion to introduce this under Left Bank Channel where water has already been allowed.	Chief Engineer agrees with this proposal.

68 BMD 69

MYSORE GOVERNMENT SECRETARIAT
NO. MU
7 OCT 1957
PUBLIC WORKS BRANCH

OFFICE OF THE MINISTER FOR PUBLIC WORKS
No. P.1847
5 OCT 1957
BANGALORE

N.V.Gadgil

Tele:No.46762.

31,Ferozshah Road,
New Delhi.

Dated 29th September 1957.

Shri H.K.Veeranna Gowdh,
Minister for Public Works,
Bangalore.

MYSORE GOVERNMENT SECRETARIAT
NO 67233
9 OCT 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Dear Shri Veeranna Gowdh,

I have your letter No.MPW 789 dated the 26th September 1957. I have already stated that everything will be done by me. The final word, however, remains with the Planning Commission. I shall speak to the Deputy Chairman of the Planning Commission about the same.

Yours sincerely,

(N.V.Gadgil)

GENERAL VERTICAL
Date 8.10.57
PUBLIC WORKS & ELEC DEPT.

MPW 794 dt 29.9.1957

PD 68 BMD

Appendix F. G.—1]

SUBJECT: Draft Report on Harakavalli project

Diary No. of letter replied to .....

Mysore Government Secretariat.

Section

File No.

Serial No.

No. PD 68 BMD dt 26.10.57

To

Dear Sir,

I am directed to forward herewith a copy of the draft report on the Harakavalli project, prepared by the Planning Commission Team, ~~for your information~~ along with a copy of D.O. letter No. 31 dt 13th Sept 57 of Sri N. V. Gadgil addressed to the Min for PW for your information.

I am to request you kindly to forward your views ~~on the draft report~~ on the draft report furnished by the Team.

The matter may kindly be treated as on T.P. Priority basis and your views furnished as early as feasible

with regards

4/5
4.10.87
U/S

7.

The CEO(I) (By name)
Bhu

19/10/87 Sms 21/10/87

20/4

D.S. Borker
Secretary, Consultative Committee
Irrigation & Power Projects & Team

614
7B

D.O.No:COPP/I&P/90/57
COMMITTEE ON PLAN PROJECTS
(Irrigation & Power Team)

Multi-storeyed Building,
(5th Floor, 'H' Wing)
Queen Victoria Road,
New Delhi

10th October 1957.

MINISTRY TO GOVERNMENT
Date 13/10/57
MLJ
PUBLIC WORKS & ELEC DEPTT.

My dear Shri Srinivasachar

1) Please refer your Minister's letter No: MPW 789 dated the 26th September 1957 addressed to Shri N.V. Gadgil, Leader of our Team.

The enclosures mentioned therein are not received hence may I request for the copies of the same?

2) why not?

Thanking you,

Yours Sincerely,

(D.S. Borker)

MYSORE GOVERNMENT SECRETARIAT
NO. 6861
12 OCT
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Shri D.K. Srinivasachar, IAS.,
Secretary to Government of Mysore,
P.W. & Electrical Department,
BANGALORE.

3) I believe the fair letter was despatched from the Minister's office the week, were not sent. I subsequently telephoned to the P.S. to M (P&RD) and handed over the week, to be sent in continuation, when his fault was noticed on the return of the file, when the file was returned from the Minister's office. pl. note.

Serial No.

Sanction to the release of Foreign exchange for Bhadra to the extent of 12 lakhs has also since been received, it is approved a copy of its enclosures will be forwarded.

SECRETARY TO GOVERNMENT
Date 21/10/53
PUBLIC WORKS & ELEC DEPTS

4) It is ascertained from the Min's office that the enclosures referred to above were sent on the next day in their No NPW 794 dt 27th Sept 53.

For personal; However, if copy of the enclosures will be now sent for ready reference; if opted.

18/10/53

29/10

23/10

23/10/53

Note.—Contn. Sheet

PWD 68 BRPS

[Appendix F. G.—I]

SUBJECT: Avalahalli Project

Diary No. of letter replied to .....

Mysore Government Secretariat.

( )

the 195 .

Section

File No.

Serial No.

No. PWD 68 RRPS 1/11/57

To

Dear Sri

Referring to your D.O. No. C.O.P.P./J.&P./90/57 10th Oct. 1957, I am to state that the enclosures mentioned therein were subsequently sent in N.P.N. No. 794 dt. 27th Sept. 1957. However, copies of the same are enclosed for ready reference ~~for your information~~.

In this connection I am to point out that there was an ~~error~~ arithmetical mistake in the totalling of the figures in the list enclosed to the letter cited. The correct amount of foreign

List of enclosures .....

Copied by.....

Examined by .....

exchange required would be Rs 16.31 lakhs and not 21 Lakhs as previously ~~reported~~ mentioned.

CE of this state has been advised to report if there are any commitments for the balance amount of Rs. 4.69 lakhs and a further communication in this regard will be made to G.O.I after the receipt of the information from him.

~~The~~ G.O.I have also sanctioned Sanction to the release of foreign exchange equivalent to Rs ~~Rs~~ 12,40,000 for the import of equipment required in connection with the Tunnel works of Bhadra project.

I am ~~also~~ to request you kindly to take necessary action, to the grant of additional assistance from the centre, so as to enable this Govt to complete this project within the end of the Second Plan period

Thanking you

Y/S
BM 29/10/57
(B.S.S)
By Sey P&D

To
Sri B.S. Barker
Secretary Commutative
Committee, Irrigation & Power
projects & Team
New Delhi.

1/11/57

29/10/57

71

Tele: No.46762.

Shri N.V. Gadgil.

31, Ferozshah Road,
New Delhi.
No. L/98 P(T)/13

Dated 11th October, 1957.

My dear Shri Gowdh

This is to acknowledge your letter reference 789 of 26th September, 1958. I have to say that everything stated therein will be considered and every possible help will be made available to you.

Sincerely yours,

(N.V. Gadgil)

Shri H.K. Veeranna Gowdh,
Minister for Public Works,
Bangalore.

OFFICE OF THE MINISTER FOR PUBLIC WORKS
No. P.1978
16 OCT 1957
BANGALORE

MYSORE GOVERNMENT SECRETARIAT
NO. 7110
PUBLIC WORKS MAJOR IRRIGATION BRANCH

MYSORE GOVERNMENT SECRETARIAT
NO. 111
16 OCT 1957
PUBLIC WORKS BRANCH

SECRETARY TO GOVERNMENT
Date 19/10/57

N.V. Gadgil
Leader
Irrigation & Power Team

EXPRESS DELIVERY/ MOST IMMEDIATE

D.O.No:COPP/I&P/82/57

PLANNING COMMISSION
COMMITTEE ON PLAN PROJECTS
NEW DELHI
(Irrigation & Power Team)

Multi-storeyed Building,
(5th Floor, 'H' Wing)
Queen Victoria Road,
New Delhi.-2.

the 18th November 1957.

SECRETARY TO GOVERNMENT
Date 21/11/57
PUBLIC WORKS

MYSORE GOVERNMENT SECRETARIAT
NO. 80/17
NOV 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Dear Gowda

Please refer to your letter No: MPW 750 dated the 3rd September 1957. The Team has now prepared a Report on the Lakkavali Project which is enclosed herewith. You might recollect that the Team is required to indicate to the Committee on Plan Projects the suggestions which have been accepted by the State Governments and on which differences exist. In this connection I would like to invite your attention to paragraph 5(iv) on page 3 of Memorandum COPP(1)/5/57 dated the 7th February 1957 which was issued to the Leader of the Team and the Mysore Government (a copy of this is enclosed herewith for ready reference- the side lined portion). I have accordingly got prepared a tabular statement showing the exact agreements reached with Mysore Government on the basis of your D.O.No:MPW 750 dated the 3rd September 1957.

P.T.O

I would very much appreciate if the enclosed statements are sent to me duly approved as early as possible so as to enable me to submit the Report to the Chairman, Committee on Plan Projects immediately.

With my renewed thanks and kind regards,

Yours

(N.V. Gadgil)

Shri H.K. Veeranna Gowdh
Minister for Public Works
Government of Mysore
Vidhan Soudha
Bangalore.

Encls: Lakkavali Report.

Memorandum.

Tabular Statement.

PWD 68 BRPS)

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT
SECRETARIAT.

(*Continuation sheet draft form*).

No PWD 68 BRPS-) dt 27.11.57)

Subt:- Final Report of the Planning Commission Team, Govt. of India, regarding Harkavathi project.

To

The C.E.N.D. (S) Blore

Sir,

In continuation of Govt's D.O. letter No PWD 8204 dt 23rd Nov 1957 regarding the above subject, I am directed to request you kindly to take immediate necessary action to discuss the subject with the Secy P.W., so that a reply may be sent to G.O.I. urgently. The matter may kindly be treated as extremely urgent.

U/S PWD

Issued
27/11/57

26/11/57 27/11/57

THE WISE PERSON'S INVESTMENT
BUY
NATIONAL SAVINGS CERTIFICATES

MYSORE GOVERNMENT
C-3. NO. 8235
PUBLIC WORKS MAJOR IRRIGATION

Date 28/11/57

THE WISE PERSON'S INVESTMENT
BUY
NATIONAL SAVINGS CERTIFICATES

BANGALORE
27 NOV 1957
BANGALORE

INDIAN POSTS AND TELEGRAPHS DEPARTMENT

No.

Received here at 17/25 H. M.

9.1
28 NOV 1957
GOVERNMENT OF MYSORE

X OC NEW DELHI 27 STE 25 CHIEFSEC BANGALORE

-FROM BORKER TO SRINIVASACHAR STOP REFERSHRI GADGILS LETTER DATED EIGHTEENTH NOV TO YOUR MINISTER STOP EXPEDITE REPLY- PLANPROJECTS -

Secy P.W.D. (Secy, Planning)

1) Addn CE(MIS) by a Dy. to come & discuss the matter with the Secy Plng on Monday the 2nd Dec at 11 am to finalise the letter

2) Send an interim reply to GOI.

The sequence of entries at the beginning of this telegram is—class of telegram, time handed in serial number (in the case of foreign telegrams only), office of origin, date, service instruction (if any) and number of words.

This form must accompany any enquiry respecting this telegram.

CPW Ms-21—19-1-56—15,500 Books

PWD 68 BRF 57

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

Subj: Final report of the flowin
Committee Team, G.O.
regarding Lokkavalli proj

Dear Sir,

In continuation of Govt's letter of even no. dt 27-11-57, I am directed to enclose herewith a Copy of telegram dt 27-11-57 received from the Secretary, Consultative Committee Irrig and power projects Team New Delhi regarding the above subject.

I request you kindly to note it convenient to come and discuss the matter with the Secretary PWD at his chambers, on Monday the 2nd Dec 1957 at 11 AM ~~(Strictly)~~, ~~to finalise the matter~~. So that the views of the State Govt on the draft report may be finalised.

4/S

29.11.57

* pl bring a copy of telegram

87

K.B.Murarappa, B.E.
Under Secretary to Government,
Public Works Department.

Mysore Government Secretariat,
PublicWorks Department,Bangalore,
Dated, 29 November 1957.

DO No.PWD 68 BRP 57

Dear Sir,

Sub:-Final report of the Planning Commission Team, Government of India, regarding Lakkavalli Project.

- - - - - -

In continuation of Government's letter of even No. dated 27-11-1957, I am desired to enclose herewith a copy of Telegram dated 27-11-1957 received from the Secretary, Consultative Committee, Irrigation and Power Projects and Team, New Delhi regarding the above subject and to request you kindly to make it convenient to come and discuss the matter with the Secretary, Public Works Department at his chambers on Monday the 2nd December 1957 at 11 AM so that the views of the State Government on the draft report may be finalised.

Yours sincerely,

29.11.57

To

Shri.C.R.Krishnaswamy Mudaliar, B.E.,
Chief Engineer, Major Irrigation (South),
BANGALORE.

Issued
29/11/57

PWD 68 B Mfn

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

Subt: Final report of the Planning Communication Team G.O.I regarding Lakkavalli project.

Dear Sir,

Kindly refer to your telegram dt 27.11.57 regarding the above subject. I am ~~[illegible]~~ desired to state that we are in receipt of the final report on the Lakkavalli project sent with Sri Gadgil's D.O. letter No. Copp/9 S.P/82 57 dt 18.11.57 addressed to the Minister for Public Works, this State. ~~[illegible]~~ A. ~~[illegible]~~ letter ~~by the way pu [illegible]~~ to the Leader of the Team is also being ~~[illegible]~~ addressed separately. The specific points raised and the suggestions made in the report are being ~~[illegible]~~ considered ~~in consultation~~ with the C E N D(S) of the State. The final views of this Govt on the subject will be communicated

WD-05448-GPB—PZS—90,000-27-9-56.

the leader of the team as early as feasible.

S.

29.11.57

Sri D. S. Barker
Secretary, Consultative Committee
Investigation & Power Projects Team
New Delhi

29.11.57

29.11.57 Copy to CE (S) for information, in connection with W.R.K. to the PO, letter No. dated.

29.11.57

91

K.B.Murarappa, B.E.,
Under Secretary to Government,
Public Works Department,

Mysore Government Secretariat ,
Public Works Department,
Bangalore, Dt. 29 November 1957.

DO No.PWD 68 BRP 57

Dear Sir,

Sub:- Final report of the Planning Commission Team Government of India, regarding Lakkavalli Project.

Kindly refer to your telegram dated 27-11-1957 regarding the above subject. I am desired to state that we are in receipt of the final report on the Lakkavalli Project sent with Sri.Gadgil's D.O. letter No. COPP/I & P/8257 dated 18-11-1957 addressed to the Minister for Public Works of this State. The Specific points raised and the suggestions made in the report are being considered with the Chief Engineer, Major Irrigation (South) of the State. The final views of this Government on the subject will be communicated to the leader of the Team as early as possible.

Yours sincerely,

To

Sri.D.S.Borker,
Secretary, Consultative Committee,
Irrigation & Power Projects & Team,
NEW DELHI.

Copy to Chief Engineer, Major Irrigation (South) for information, with reference to this office D.O.letter No. PWD 68 BRP 57 dated 29-11-57.

Issued
29/11/57

29.11.57
Under Secretary to Government,
PublicWorks Department.

9

TELEGRAM/STATE/EXPRESS

HIEFSEC

ANGALORE

FROM BORKER TO SRINIVASACHAR STOP REFER SHRI GADGIL'S LETTER DATED EIGHTEENTH NOVEMBER TO YOUR MINISTER STOP EXPEDITE REPLY

PLANPROJECTS

Not to be telegraphed:

SECRETARY TO GOVERNMENT
No 79
29 NOV 1957
PUBLIC WORKS & ELEC. DEPTT.

Sd/-
(D.S. Borker)
Secretary, Consultative Committee
on Irrigation & Power Projects
& Team.
27.11.57

No:COPP/I&P/82/57/
COMMITTEE ON PLAN PROJECTS
(Irrigation & Power Team)

MYSORE GOVERNMENT SECRETARIAT
NO. 8243
29 NOV 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

Multi-storeyed Building,
(5th Floor, 'H' Wing),
Queen Victoria Road,
New Delhi-2.

the 27th November 1957.

Copy by post forwarded in confirmation

(D.S. Borker)
27.11.57

Shri D.K. Srinivasachar
Secretary to the Government of Mysore
Public Works and Electrical Departments
BANGALORE.

I send you following telegram:

"Your telegram about Sri Gadgil's letter to our Minister stop Chief Engineer concerned on tour outside state and expected back in two-three days stop. Final reply will be sent by third or fourth at latest" 29/11

URGENT TELEGRAM

BORKER
SECRETARY CONSULTATIVE COMMITTEE
IRRIGATION & POWER PROJECTS & TEAM
NEW DELHI

- -

YOUR TELEGRAM ABOUT SRI CADDILL' LETTER TO OUR MINISTER STOP CHIEF ENGINEER COUNCILLED ON YOUR OUTSIDE STATE AND EXPECTED BACK IN TWO THREE DAYS STOP FINAL REPLY WILL BE SENT BY THIRD OR FOURTH AT THE LATEST

PUBLIC WORKS SECRETARY

- -

(Not to be telegraphed)

From

Sd/-

Secretary to Government, of Mysore,
Public Works Department.

PWD 68 BRPSM -dt 29-11-57

Copy by post forwarded in confirmation to Sri D.S.Borker, Secretary, Consulatative Committee on Irrigation & Power Projects & Team, New Delhi.

(K.B.Murarappa) 29.11.57
Under Secretary to Government,
Public Works Department.

29/11/57

EXPRESS TELEGRAM.

BORKER
SECRETARY, CONSULTATIVE COMMITTEE
IRRIGATION & POWER PROJECTS & TEAM
NEW DELHI.

- -

YOUR TELEGRAM ABOUT SRI GADGILS' LETTER TO OUR MINISTER STOP CHIEF ENGINEER CONCERNED ON TOUR OUTSIDE STATE AND EXPECTED BACK IN TWO THREE DAYS STOP FINAL REPLY WILL BE SENT BY THIRD OR FOURTH AT THE LATEST

PUBLIC WORKS SECRETARY

- -

(Not to be telegraphed)

29.11.59

for Secretary to Government of Mysore,
Public Works Department.

Issued
29/11/59

EXPRESS

D.S. Borker,
Secretary, Consultative Committee
Irrigation & Power Projects & Team

सत्यमेव जयते

SECRETARY TO GOVERNMENT
79
Date 30/11/57
PUBLIC WORKS & ELEC. DEPTT

COPP/I&P/82/57/

PLANNING COMMISSION
COMMITTEE ON PLAN PROJECTS
NEW DELHI
(Irrigation & Power Team)

Multi-storeyed Building,
(5th Floor, 'H' Wing)
Queen Victoria Road,
New Delhi-2.

the 28th November 1957.

Dear Shri Srinivasachar,

Please refer Shri Gadgil's letter No. COPP/I&P/82/57 dated 18.11.57 with enclosures:

(1) Lakkavalli Report
(2) Memorandum
(3) Tabular Statement.

The enclosed statement may please be inserted in place of statements sent earlier which may please be treated as cancelled.

Yours Sincerely,

(D.S. Borker)

copp/I&P/Dy No 2405
28.11.57

Shri D.K. Srinivasachar, IAS.,
Secretary to Government of Mysore,
Public Works Department,
Vidhan Soudha,
Bangalore.

Encl: Statement

Paragraph No. (1)	Recommendations made in the Lakkavali Project. (2)	Comments of Mysore Government. (3)	Comments of Irrigation and Power Ministry. (4)	+ Additional Expen--diture - Saving. (5)
1.Scope of Project:				
1.2(i)	It is suggested to negotiate with tenderers for supply of electri--cal machinery, to provide for overload capacities upto 6000 K.W. so as to enable utilising the waters for generating more electricity during the initial stages of irrigation when full demand for irrigation would not have been developed.	Accepted; Revised tender notifications were based on the proposal of overloads upto 15% of rated capacity has been provided for which only. This was not to start soonest possible		
1.2(ii)	There is a need to replace the old Madras Hyderabad-Mysore agreement by a new Andhra-Mysore agreement, with a proviso to allow Mysore to keep a carry--over to be utilised in lean years, which would increase generation of firm electricity every year without detriment to the interests of Andhra, in addition to warding off shortages in lean years.	Accepted		

(1)	(2)	(3)	(4)	(5)
2. Administration.				
2.6(i)	It is recommended to create an additional Circle under a separate Superintending Engineer charged with the execution of the Hiremalali Tunnel and all the canal works lower down the Tunnel, with a view to completing the project in time.	Accepted; ~~action has already been taken and~~ a Tunnel circle has already been constituted and may stay		
2.6(ii)	It is recommended to create a Central Designs Organisation, directly under the Chief Engineers with its branch offices located at the Superintending Engineer's headquarters, to keep a laiason between the field officers and the Central Cell. The exact staff etc. required for this Organisation is to be worked out by the State authorities.	Accepted		
2.6(iii)	With a view to making available the services of the Research Station at Krishna Raj Sagar to the projects, promptly the Research Officer may carry out research for the project under guidance of and report direct to Chief Engineer, Major Irrigation instead of through Chief Engr., (General), as, then the Research Officer can promptly carry out his responsibilities, after establishing direct contacts with the field engineers.	Accepted; KRS Research station is at present under our control or the MI(G) himself		

(1)	(2)	(3)	(4)	(5)
2.6(iv)	Strengthening of field laboratory on the Project and appointing a special senior Executive Engineer in charge of quality control and Laboratory to be responsible to Chief Engineer, direct is recommended.	Accepted to the extent of strengthening of field laboratory. As regards in the other area of quality control, it is considered that the Design circle proposed to be set up for Sharavathi & Bhadra can take care of them.		
2.6(v)	Training of Storekeepers in a proper way, with or without the help of outside agencies like Commerce Colleges, with a view to meet shortages in such personnel.	Accepted		
3. Phasing of construction programme.				
3.3	Partially raising the dam to level 106', instead of 98' by June 1958, is suggested so as to achieve irrigation of about 50,500 acres during 1958-59 on Right Bank Canal.	Accepted		
3.5	It is urged that the tunnel should be completed in 2 years time i.e. by 1959 June, and the rest of the canal by 1961 June.	Accepted		

(1)	(2)	(3)	(4)	(5)
4. Features of Design and Const--ruction.				
4.2	Providing Field Control Laboratory (Soil Mechanics) for the earth dams is suggested.	Accepted		
4.3	It is recommended to instal instruments measuring deflection, temperatures, uplifts and stresses of Masonry Dam and consolidation, settlement and prepressures of earth dams.	Accepted		
4.6	It is proposed to standardise the ingredients of and technique of preparing Lime Surkhi Mortar with a view to minimising the variations in the strength of mortar as now noticed.	Accepted		
4.7	In general, the earth moving machinery is not utilised to their full life and they need to be employed on more gainful works with greater efficiency.	Accepted ; in many machines is fully utilised at present		

(1)	(2)	(3)	(4)	(5)
5. Canal Works				
	5.2 Alternative scheme of machinery for the Tunnel is suggested by the team which would result in a saving of Rs. 10 lakhs on the projected outlay on Machinery for this purpose.		Accepted. A revision has since been taken to call for tenders for a portion of the work; this procedure is will result in a reduction in cost of machinery to be acquired.	
	5.3 The team has suggested (appendix-8) to take the Davangere Branch of the channel from over the Shantisagar Bund, in an R.C.C. trough, a proposal which would be cheaper than the rest of the alternatives by 20 to 54 lakhs.		~~Accepted~~ The matter decision in regard to the alignment has been left to the Chief Engineer in charge of the project who will take into consideration the views of the Team as well as the especially members of the State Govt.	
6. Development of Irrigation.				
	6.11 There is a scope for upward revision of water rates.		~~Accepted~~ A new law regarding betterment contribution ~~levy~~ & water rates has been passed and ~~rates~~ levies will be governed by the provisions of the law and of the rules. According to this law contribution may be upto Rs. 300 per acre and water rates depending on the crop grown, ~~upto~~ vary between Rs. 5 & Rs. 20/- per acre per annum	

(1)	(2)	(3)	(4)	(5)
6.13	Adoption of Bombay's pattern of Irrigation Administration and Management, wherein the Irrigation Development controls the management, which includes regulation of canals, preparing irrigation programmes annually, checking unauthorised irrigation, waterlogging and salt efflorescence, providing drainage schemes, preparing assessment papers and fixing up crop patterns etc.etc.	Accepted		
6.14	Block system should be enforced to avoid haphazard development of irrigation as has happened on Irwin Canal.	Accepted		
7.Generation of Electricity.				
7.5	In order to accept a firm additional load of 25,000 K.W. at the load factor of the system, it would be necessary to carry over waters from surplus years to lean years.	Accepted		

(1)	(2)	(3)	(4)	(5)
7.6	Overload capacity should be provided for and negotiations should be carried out with suppliers of machines to this effect so as to enable generation of more power.	Accepted ; see item ~~(b)~~ 1(b)(i) refd		
7.7	The monsoon inflow on the reservoir should be so regulated as to have the reservoir full (186') by 1st October and depleted to lowest level by June next. In case the monsoon is found too weak to fill the tank, the discharges at river bed should be suitably reduced, so as to obtain a level of reservoir as near to 186' as possible at the end of Monsoon.	Accepted		
8. Construction costs.				
8.7	Steel is being used on canal (acqueducts) and there is scope for saving it(by replacing R.C.C.by Masonry and plain concrete arches).	Accepted ; we will be implemented wherever possible in future.		

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MPW. 1068/Statement dt 5/12/57

Dear Shri.Gadgil,

Kindly refer to your D.O.letter No.COPP/I&P 82/57 dated 18th November 1957 about the report of your Team on Bhadra Project. I am very sorry that owing to my long absence from headquarters until a couple of days ago, I could not reply to you earlier. I am now enclosing the statement received with Shri. Borker's letter duly filled in.

Issued

Yours sincerely,

H.C. Veeranna Gowda

(MINISTER FOR P.W.) 5/12

Shri.N.V.Gadgil,
Leader of the Irrigation & Power Team,
Committee on Plan Projects,
Planning Commission,
New Delhi

M. G. S. App. F. G. 3]

MYSORE GOVERNMENT

SECRETARIAT.

(*Continuation sheet draft form*).

By Express Delivery

To

Sri; D. S. Bonker,

Secy Consultative Committee

Irr. & power projects &

Team —

Tulsi Standard Building

5th Floor 'H' wing

Queen Victoria Road

New Delhi 2

10-12

VD 03737-GPB—PZS- 50,000—1-3-56.

Q. 1 PWD 68 13 April 57

116

Dear Sir,

Please refer to your letter no Copp/ JSP 182/57 dt 28th Nov. 57, about the report of your Team on Bhakra project. I am enclosing a copy of statement duly filled in, as sent to the leader of the team for information.

Yours S.

10/12/57

10/12/57

Issued 10/12/57

BY EXPRESS DELIVERY.

118

K.B.Murarappa, B.E.,
Under Secretary to Government,
Public Works Department.

Mysore Government Secretariat,
Bangalore, dated, 10 Dec. 1957.

DO No.PWD 68 BRP 57

Dear Sir,

Please refer to your letter No. COPP/I & P/82/57 dated 28th November 1957 about the report of your Team on Bhadra Project. I am enclosing a copy of statement duly filled in, as sent to the Leader of the Team for your information.

Yours sincerely,

10.12.57

To

Sri.D.S.Borkar,
Secretary Consultative Committee,
Irrigation and Power Projects and
Team - Multi Storied Building,
5th Floor 'H' Wing,
Queen Victoria Road, NEW DELHI-2.

Issued
10/12/57

D.S. Borker,
Secretary, Consultative Committee
Irrigation & Power Projects & Team

'Express'

119

D.O.No:COPP/I&P/82/57/

PLANNING COMMISSION
COMMITTEE ON PLAN PROJECTS
NEW DELHI
(Irrigation & Power Team)

Multi-storeyed Building,
(5th Floor, 'H' Wing)
Queen Victoria Road,
New Delhi-2.

the 12th December 1957.

My dear Shri Srinivasachar

Please refer your Minister's letter No: 1068/Statement dated the 5th December 1957 to our Leader, Shri N.V. Gadgil indicating the views of the Mysore Government on the Report of the Irrigation & Power Team for Lakkavalli. P-114 CF.

Shri N.V. Gadgil has informed me that he rang up Shri Veeranna Gowdh yesterday in regard to the replies given on paragraph 5.3 of the Lakkavalli Report. It appeared from the conversation that the decision of the Mysore Government rested primarily on the results of the trial pits in the Bund of the Sulekheri Tank. Shri Veeranna Gowdh agreed to furnish further details in a self contained note to our Leader. As the matter is to be discussed finally in the Committee on Plan Projects, I will suggest that the note may please be prepared in the form in which the directions of the Committee require. I enclose herewith a copy of the paragraph of the Memorandum sent by the Committee on Plan Projects to the Leader of the Team.

This may kindly be treated as urgent.

Yours Sincerely,

(D.S. Borker)

Shri D.K. Srinivasachar, IAS.,
Secretary to the Government of Mysore
P.W. & Electrical Departments
Vidhan Soudha (Secretariate)
Bangalore.

Encl.

Extract from Memorandum from the Committee on Plan Projects to the Leader of the Team for the study of Chambal and Lakkavalli (Bhadra) Irrigation Projects.

(iv) The broad procedure for the work of the Team, as laid down by the National Development Council, is contained in paragraph 6 of Annexure I to the Memorandum. The purpose of the procedure prescribed, as it will be readily appreciated, is that an endeavour should be made to reach agreement, as far as possible, on all points with State Governments/Central Ministries concerned. The report of the Team should, therefore be a brief document in four parts:

(a) Points on which agreement has been reached with the project authorities/State Governments /Central Ministries.

(b) Points on which agreement could not be reached along with a brief statement of the opposing views.

(c) Points which require further detailed examination.

(d) The financial effect of the suggestions made at (a) and (b) above.

D.O.NO.COPP/I&P/1957

PLANNING COMMISSION

~~NEW DELHI~~

COMMITTEE ON PLAN PROJECTS
(Irrigation & Power Team)

Multi-Storeyed Building,
(5th Floor 'H' Wing)
Queen Victoria Road,

New Delhi,
December 9, 1957.

My dear Shri Shrinivasachar

I am forwarding herewith two copies of the Report on the Lakkavali Project.

With my warm regards,

Yours Sincerely

(D.S.Borker)

Shri D.K.Shrinivasachar, I.A.S.,
Secretary to Government,
Public Works Department
Mysore State,
Bangalore.

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D.K.Srinivasachar, I.A.S.
Secretary to Government,
P.W. & Electrical Dept.

D-O-No-P-A-350

MYSORE GOVERNMENT SECRETARIAT
Dated Bangalore 13th Dec. 1957

My Dear Shri.Borker,

Thank you for your letter of 9th December enclosing two copies of the Report on Bhadra Project.

Yours sincerely,

M.D. Sec)

Shri.D.S.Borker,
S e c r e t a r y,
Committee on Plan Projects,
(Irrigation & Power Team)
Multi Storeyed Building,
(5th Floor 'H' Wing)
Queen Victoria Road,
New Delhi

D.O.No.PWD 68 BRP 57

Express Delivery

Dear ~~Sir,~~ Sri

This will go under the signature of S.S.

Please refer to your D.O.letter No.Copp/I&P/82/57 of 12th Decr. 1957, regarding the Report of the Irrgn. & Power Team for Lakkavalli.

I am desired to state that the State Govt. is in general agreement with the recommendations made by the Team and a statement of the points on which agreement has been reached (except item No.5.3. & 6.11) was sent to the Leader of the Team with letter No.MPW 1068 dt. 5th Decr. 57.

Item No 5.3, pertains to the suggestion made by the Team ~~has proposed~~ to take the Davanagere branch of the Channel ~~from~~ over the Shantisagar bund in R.C.C. trough. As already indicated in the statement, the decision in regard to the alignment was left to the Chief Engineer, incharge of the Project. I am to state, that the C.E. has since reported that after taking into considerations all the aspects of the case and in the light of his personel experience and knowledge he has decided to ~~take the~~ adopt the alternative channel behind the bund, instead of over the Bund. A detailed note indicating the present position and the reasons for the decisions taken by the C.E. in the matter, has also been sent to the Leader of the Team by the Minister for P.W. in his letter No.MPW 1102 dt. 13th Decr. 57. A copy of it is enclosed.

As regards item No. 6.11, I am to mention that the levy of water rates will be governed by the provisions of the new law regarding Betterm

Contribution and Water rates and the rules there-
under, as already stated.

With regards.

Yours sincerely,

To

Shri D.S. Borker,
Secretary, Consultative Committee,
Irrgn.& Power Projects & Team,
Multi-storied building (5th Floor H Wing)
Queen Victoria Road, NEW DELHI. 2.

B. S. SRIKANTIAH, I.A.S.,
Deputy Secretary to Government,
Public Works and Electrical Departments.

MYSORE GOVERNMENT SECRETARIAT,
Bangalore, dated 18th Dec 1957

D. O. No. P. W. D. 68 BRP 57

Dear Shri. Borker,

Please refer to your D.O. letter No.Copp/I&P/82/57 of 12th December 1957, regarding the Report of the Irrigation and Power Team for Lakkavalli.

I am desired to state that the State Government is in general agreement with the recommendations made by the Team and a statement of the points on which agreement has been reached (except item No. 5.3 & 6.11) was sent to the Leader of the Team with letter No.MPW 1068 dated 5th December 1957.

Item No. 5.3, pertains to the suggestion made by the Team to take the Davanagere Branch of the Channel over the Shantisagar Bund in R.C.C. trough. As already indicated in the statement, the decision in regard to the alignment was left to the Chief Engineer, incharge of the Project. I am to state, that the Chief Engineer has since reported that after taking into considerations all the aspects of the case and in the light of his personel experience and knowledge, he has decided to adopt the alternative of taking channel behind the bund, instead of, over the Bund. A detailed note indicating the present position and the reasons for the decisions taken by the Chief Engineer, in the matter, has also been sent to the Leader of the Team by the Minister for Public Works in his letter No. MPW 1102 dated 13th December 1957. A copy of it is enclosed.

As regards item No. 6.11, I am to mention here that the levy of water rates will be governed by the provisions of the new law regarding Betterment Contribution and Water rates and the rules thereunder, as already stated.

With regards.

Yours sincerely,

BSS
18/12/57

o/c

To
Shri.D.S.Borker,
Secretary, Consultative Committee,
Irrigation and Power Projects & Team,
Multi-storied Building (5th Floor H Wing),
Queen Victoria Road, NEW DELHI-2.

Issued
18/12/57

POST BOX Nº 12.

STATE BANK OF INDIA
CENTRAL OFFICE
BOMBAY, NO. I

18th December 1957.

OFFICE OF THE MINISTER FOR PUBLIC WORKS
No. P-2884
26 DEC 1957
BANGALORE

My dear Shri Gowda,

I am sending herewith a copy of the Team's Report on Lakkavalli Project. I take this opportunity to thank you, your Project Officers and all other officials connected with this work for the great help and cooperation they all gave us in completing this study. I am sure you will find this report to your advantage. I am glad that I got an opportunity to be of some humble service to your State.

Yours sincerely,

(N.V. Gadgil)

MYSORE GOVERNMENT SECRETARIAT
NO.
27 DEC 1957
PUBLIC WORKS BRANCH

Shri Gowda,
Minister-in-charge for Irrigation,
Government of Mysore,
Bangalore.

MYSORE GOVERNMENT SECRETARIAT
NO. 9183.
31 DEC 1957
PUBLIC WORKS - MAJOR IRRIGATION

SECRETARIAT
Date 28/12/57
PUBLIC WORKS & ELEC. DEPTS.

D.O.No.~~PWD~~

M. PW 1210 D 6/1/58

Dear Sri Gadgil,

I acknowledge with thanks the receipt of the copy of the Team's Report on Lakkavalli project sent with your letter of 18th Decr.57 I am ~~very~~ grateful to you for the help and assistance rendered ~~by you in this hard task~~ to this State, in the execution of this project.

Yours sincerely,

3/1

To

Sri N.V.Gadgil,
Leader Irrigation & Power Team,
Committee on Plan Projects,
State Bank of India,
Central Office, Post Box No.12,
BOMBAY - 1.

31.12.57 31.12.57

ORGANISATION OF INVESTIGATIONS INTO IRRIGATIONAL POWER PROJECT."

Mysore Government Secretariat

File No. PD.3689 of 1958.

[App. F. III 2

Serial No.

~~13)~~ Seen. Thanks

~~14)~~ Please return the main report to P.W.D. as further action on many points has to be taken by them - particularly the points made in paras 3.8 to 3.11.

Sd/- G.V.K. Rao
25/6/58.

26.6.58

Attested.
S.N. Ramasamy
Under Secy.

U.S.
P.W.D. Shri Nanaiappa

MYSORE GOVERNMENT SECRETARIAT
NO. 55.18
27 JUN 1958
PUBLIC WORKS MAJOR IRRIGATION BRANCH

The subject referred to in paras 3.8 to 3.11 has already been taken up by G.O. and a subcommittee with Sri Kanwar Sain as chairman has been constituted. Sri T.J. Moorty (CE/MIN) is representing our state in this subcommittee. Pl. verify & put up.

26/6

Note.—Contn. Sheet

File No. of 195

Mysore Government Secretariat

Serial No.

WD 01774—GPB—PZS—800,000—26-10-57

5773/III

SECRETARY TO GOVERNMENT
Date 2/9/57
PUBLIC WORKS & ELEC. DEPTS.

The draft report on Lakkavalli Project (placed below) prepared by the Planning Commission Team was discussed with me when I was on leave, some time ago, by Shri.M.Narasimhaiya, one of the Members of the Team. I understood from him that he would discuss the matter with Shri.B.S.Srikantiah also. I would like to know if any action has been taken on the draft report in pursuance of the discussions.

2/9/57

D. K. SRINIVASACHAR
Secy. P. W. & Elec. Depts.

2/9/57

Mr. Murarappa

I believe the file was submitted to the M(PWD) along with a draft D.O. letter (interim reply) addressed to Sri. Gadgil, Leader of the team, to be issued under the signature of the M(PWD). Pl. verify in the office of the Prime Minister and get back the file, for taking further action, as per instructions issued to me, by the Secy PWD.

2/9/57

It is ascertained from the Min's office that the file relating to the above has been returned to the Secy PWD to-day. It is also verified that the file is on the table of the PWD Secy.

2/9/57.

To file

Pl. put up when the main

4/8/57

Copy 20

DRAFT REPORT ON LAKKAVALI PROJECT.

(AUGUST 1957)

L A K K A V A L I

1. Brief History
2. Scope of the Project.
3. Agreement regarding utilisation Bhadra waters.
4. Administration.
5. Organization.
6. Phasing programm
7. Features of designs and construction.
8. Urgent works needing attention.
9. Development of irrigation and irrigation management.
10. Costs.

* * * * * *

LAKKAVALI PROJECT

1. Brief History

1.1 The idea of utilising for irrigation the waters of the river Bhadra at Lakkavali, Mysore State, has been under consideration of the Government of Mysore since 1856. Detailed investigations were however started in 1927 and negotiations with the Government of Madras for their consent were initiated.

1.2 Certain modifications had to be made to conform to the claims on these waters of the neighbouring States, viz. Madras and Hyderabad. To facilitate the construction of the Bhadra reservoir on the Bhadra river and the Tungabhadra reservoir on the Tungabhadra river to be jointly constructed by the Madras and Hyderabad Governments, an understanding was arrived at amongst these States for a partial sharing of the available dependable supplies.

1.3 During the year 1933-34 a Project was prepared for the construction of a 180 ft. high dam to store 61.250 M. cft. for irrigation, power and navigation. This project was modified to accord with the terms of the water agreement with Madras, according to which only 60,000 m.cft. could be utilised for irrigation. As regards power, additional supplies could be impounded provided the quantity of water so stored was returned to the river undiminished in the same year. Subsequently, the quantity of water to be utilised for irrigation was reduced to 57,000 m.cft.

1.4 The interest in the project was revived soon after the Second World War and the estimate originally prepared was revised by increasing the rates by 25%. The construction work was taken in hand in 1947 with the object of completing it within ten years. However the work could not make rapid progress due to financial

stringency. In fact, Government at one stage (1950) intended to abandon the project but on the recommendations of a Technical Committee the works were allowed to proceed at a "go slow" pace.

1.5 It was only in 1953 that strong representations were made to the Government of India for financial assistance to this useful project and the Government of India agreed to sanction Rs. 3 crores during the First Five Year Plan period. Steps were taken immediately to expand the construction organization to suit the increased tempo with a programme to complete the works by 1961. (Statement showing yearwise expenditure on works - appendix 2)

1.6 The principal features of the project are given in appendix - 1 along with an index map.

2. Scope of the Project

2.1 The Bhadra river was gauged jointly by the Governments of Mysore and Madras from 1928 to 1930 and a relationship between gauges and discharges established. From subsequent observed gauge readings the river discharges were computed. The total annual inflow in the river at the dam site varies from 1,50,000 m.cft. to 75,000 m.cft., the dependable inflow being about 1,00,000 m.cft.

2.2. As stated earlier the utilisation of water for irrigation is limited to 57,000 m.cft. However, the total annual utilisation for irrigation and power is of the order of 90,000 m.cft., which is 90% of the mean annual supply. Such a high percentage of utilisation is perfectly understandable in view of the fact that in the old Mysore State there has been an acute shortage of power resulting from ever increasing demands.

2.3 It is intended to generate power from discharges released into the river bed and also from the discharges released into the Right Bank and Left Bank channels. In this manner the maximum possible power will be generated.

2.4 During good years surplus water is available. Besides, in the initial years, irrigation will not have developed fully and a good proportion of the water earmarked for irrigation can be utilised for generation of additional energy by discharging this surplus into the river bed, thus obtaining greater head for power generation. Also an additional peaking capacity could have been achieved by providing a third

penstock outlet for installation of a third 12,000 kW unit. This is not possible now as the dam has been built well above the penstock level. It is however suggested that during the final negotiations with the successful tenderer, maximum overload capacity for the two river bed generating units be called for and incorporated in the final designs of the units.

2.5 Experience shows that demand for power is mounting up and is outstripping load forecasts and generating capacitities. It is usual to exploit water potential for maximum firm power. In view of additional supplies becoming available for power production in the initial years, when full irrigation is not developed, the desirability of making due provision in the civil structures for such utilisation needs to be examined at the design and construction stage.

2.6 The technical suggestions in respect of the power plant and its operation will be found in Shri N.N. Iengar's D.O. letter dated 6th July, 1957, addressed to the Leader of the Irrigation and Power Team, at appendix - 3.

2.7 It is also planned to utilise water released for irrigation to the maximum extent by reusing for additional irrigation, water regenerated into nallas from the irrigated tract. This is proposed to be achieved by constructing pick up weirs across them.

2.8 The fullest use of the supplies in the Lakkavali storage for power can, however, only be secured if the regulation of water permits certain balances to be left over in the reservoir in good years to be utilised in subsequent lean years. This particular aspect is dealt with below.

form was signed by representatives of the two States on 24-7-1944. (Vide appendix - 4).

3.5 In the meanwhile the Madras Government had also a scheme for the construction of a large reservoir on the Tungabhadra river at Mallapuram. As the rivers formed the boundary between the Madras and Hyderabad States at this site, the scheme had to be a joint one for the two Governments and the shares of the participat-ing States had to be determined.

3.6 Through the good offices of the Government of India an understanding was arrived at in December 1945 amongst the three States, so as to facilitate the construction of the reservoir at Lakkavali and the joint reservoir on Tungabhadra at Mallapuram for utilising part of the available supplies in Tungabhadra.

3.7 An Arbitration Tribunal was under consideration for determining the final shares of each of these States.

3.8 Territorial changes consequent on the reorganisation of the States in 1956, have resulted in the disappearance of the Hyderabad State, the territory in the old Hyderabad State affected by the Project having been added partly to the enlarged Andhra State and partly to the Mysore State. In view of these changes the existing agreements need to be reviewed as early as possible and it is suggested that the Government of Mysore who are the major beneficiary in the Project should take the initiative in the matter in view of the large interests involved.

3.9 The examination of the Lakkavali reservoir working tables for releases for irrigation and power

show that in order to make the fullest use of the water resources and to obtain the designed outputs, it is essential that the reservoir should maintain carry-overs in good years. According to clause 2 of the existing agreement between the Mysore and Madras Governments any quantity of water impounded in the reservoir for purposes of generation of power only is required to be released into the river undiminished, within the same year. The clause thus prevents Mysore from maintaining a carry-over. It appears that a carry-over in the Lakkavali storage would not only benefit Mysore but also the projects downstream since additional water from Lakkavali will be released in bad years for utilisation. It may be stated that the design of the Lakkavali Dam permits such a carry-over to be maintained and this space will be left unutilised if carry-over is not permitted.

3.10 Since the Mysore State have a large share in the Tungabhadra reservoir water, it may now be feasible to devise an inter-related regulation for both the Lakkavali and Tungabhadra reservoirs.

3.11 As this is a matter in which a considerable avoidable loss of units (61 x 10^6) and of revenue (Rs. 7½ lakhs) is involved in a bad year (appendix -) it is suggested that the Mysore State should take the earliest opportunity to examine this question and get it solved to the mutual satisfaction of the concerned States. The guiding principle should be an integrated development of the river valley treated as a unit.

4. Administration

4.1 This Project is under the administrative control of the Chief Engineer, Major Irrigation (South) He is also in charge of the Sharavati Valley Hydro Electric Scheme and certain other Projects of the State.

4.2 Estimates and technical proposals are submitted by him to the Government who in their turn refer these matters to the Standing Technical Advisory Committee. (For the Government orders constituting the original Standing Technical Advisory Committee see Appendices 5-6).

4.3 The present members of the Standing Technical Advisory Committee are:

Chief Engineer, Major Irrigation South,
Chief Engineer, General.
Six retired Chief Engineers,
Retired Director of Hydraulic Research,
Chief Engineer, Electricity Department,
Secretary to Government, P.W.D.
Under Secretary to Government, P.W.D. (Secretary).

4.4 It is understood that the Mysore Government have constituted a smaller committee for the Sharavati Valley Hydro Electric Project. This Committee consists only of four technical members. As compared with the Standing Technical Advisory Committee, this committee for Sharavati Project has the advantage of compactness.

4.5 The Committee has generally a preliminary meeting (with the Chief Engineer as Chairman) with only engineer Members present, when the engineering problems

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are discussed and tentative conclusions arrived at and proceedings drawn up with draft resolutions for the consideration of the regular meetings of the Standing Technical Advisory Committee.

4.6 At subsequent meetings when the Minister, P.W.D. presides, these decisions are ratified. Such decisions are generally adhered to and implemented.

4.7 This Committee, although acting in an advisory capacity has always carried great weight with the Mysore State and its recommendations have been accepted without exception.

4.8 Those decisions and other administrative matters are taken up by a High Power Committee comprising the Minister as Chairman with Secretaries to Government, Public Works, Finance and Development Departments; President, Stores Purchase Committee, Two Chief Engineers and Shri M. Narasimhaiya as Members (vide appendix - 7).

4.9 The constitution of this Special Committee has been made with the definite object of seeing that routine departmental procedures that are generally adopted in other matters are got over and action taken in respect of important matters of the Project with the least delay. The resolutions passed by this High Power Committee constitute an authority for implementation. This in a way is analogous to the Control Boards that have been organised for Chambal and some major projects in other parts of India.

4.10 The interests of the Projects and the efficient progress are indeed assured by the above two Committees.

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This is undoubtedly due to the ripe experience and personal knowledge of the Members of the Standing Technical Advisory Committee gained during their long careers in the State and of the functions and delegations of the Secretaries to Government who form the Committees and the authority of the Minister who is the Chairman of these Committees.

4.11 The presence of the two Chief Engineers in these two Committees is of a great advantage because interrelated administrative matters can be resolved. As the Chief Engineer, General, in the Mysore State is in charge of the entire establishment and administration, his assistance and cooperation has an important bearing in the efficient progress of the Project to some extent.

4.12 At present the Members of the Standing Technical Advisory Committee are working in an honorary capacity. They are paid daily allowance, travelling allowance and sitting fees at Rs.10/- per meeting.

4.13 It is considered that the payment of reasonable remuneration is essential for the Members of such a Committee. They have to spend their valuable time in the proper study of the intricate technical problems of urgent nature on which effective progress is necessary in the interest of the Project.

4.14 In view of the need of mature and experienced engineers at this stage in the country's development programme, the continued association of available technical talent with vast experience is considered all important. Hence the adoption of the principle of the Standing Technical Advisory Committee is considered highly desirable for other regions.

5. Organisation.

5.1 The entire project is under the executive control of a Superintending Engineer, In addition to this work he is in charge of the Tunga Anicut Project and an other major tank work which is about 50 miles from his Headquarters.

5.2 He is assisted by eight Executive Engineers, one of whom is on surveys and canal designs. (Vide appendices 8-9 for statement of sanctioned and working strength of establishment in the Circle).

5.3 The work on the Tunga Anicut project is nearly completed, but the tempo of the progress on the Lakkavali project needs to be intensified immediately. The large and important works of the 2¾ mile long tunnel on the Right Bank Channel, and the excavation of the Malebennur and Davangere Branches are to be started immediately and proceeded with at a rapid pace so as to synchronize with the completion of the Lakkavali dam. These works are situated at a great distance from the site of the Lakkavali dam. The construction of the dam is reaching a stage when the construction of the power houses, installation of the turbines and the generating units, installation of sluice gates and crest gates etc. will have to be undertaken according to schedule. These works will need considerable personal attention of the Superintending Engineer. It is absolutely necessary that a second post of Superintending Engineer should be created without loss of time to take charge of the construction of the channel tunnel and the Malebennur and Devangere Branches. The total annual expenditure on this

were of a major character. The prevailing practice is to get the modified or new designs prepared in the office of the Executive Engineer concerned. This practice needs a change. A centralised Designs Cell attached to the Chief Engineer's office would be much more efficient and will conduce to saving of time and technical manpower and standardization of designs. This Cell must have a close liaison with the field work.

5.7 The design of the spillway and the stilling basin and certain other features of the dam were based upon the results of several hydraulic model studies carried out at the Hydraulic Research Station at Krishnarajasagar. This station is under the administrative control of the Chief Enginner, General. The current procedure is that the estimate for the cost of conducting the model experiments has to be approved by the Chief Engineer, General. Also, the results of the tests are communicated by the Director, Research Station to the Chief Engineer, General, who transmits them to the Special Chief Engineer in charge of the Project. This procedure is dilatory. As the cost of the model studies is met with from the Project funds, the sanction to the estimates should be accorded by the Project authorities. The Research Officers should maintain close contact with the Project Engineers, should visit the site of the work if necessary and communicate the results of the tests to the Project Authorities direct under intimation to the Chief Engineer, General, who is the Controlling Officer of the Station.

5.8. At present the Laboratory facilities for field research work and tests on this project are

inadequate. Both in the interest of the project itself and as a contribution towards a general advancement of scientific knowledge and technique, it is necessary to expand the laboratory organization in the fields of building materials particularly, mortars, concrete and soil mechanics.

For a large work like the Lakkavali Project which is mostly being executed departmentally, the quality of works and strict observance of specifications have to be continuously watched and ensured. A distinct organization headed by an experienced senior Executive Engineer directly under the control of the Chief Engineer needs therefore to be maintained. The Inspection agency should also be in charge of laboratory tests and any variations required in the composition of concrete or mortar have to be its responsibility. By this means not only uniformity of quality but economy can be secured.

5.9 In a work of this nature involving concurrent construction of the dam and the power-house, the details of foundations, tail race levels and approximate dimensions of the power house structure need to be finalised by the Electricity Department in time so as to fit in with the programme of excavation of foundations and construction of the dam. For this purpose and for orderly construction of civil engineering works connected with the power plant a continuous coordination between the two Departments is essential.

5.10 On this project an Assistant Accounts Officer has been appointed. He is directly responsible to the Superintending Engineer. He visits the Divisional

should be delegated to the Officers of Mysore particularly in view of the considerably increased magnitude and responsibilities of the development works consequent to the Integration. (Appendix -13).

6. Phasing programme

6.1 In a multipurpose or irrigation project it is to an economic advantage if the construction programme is so arranged that benefits start accruing even before the project is fully completed.

6.2 In the Lakkavali project the construction programme is such that a progressive accrual of irrigation benefits is secured (aapendix -35).

(a) The sluice of the Left Bank Channel is at 36 above river bed. The dam was raised above this level in 1955-56. Simultaneously the Left Bank Channel was completed and opened for irrigation (12,500 acres).

(b) The sluices of the Right Bank Channel are located at R.L. + 100. The Right Bank Channel is divided into the following three Sections.

Section I. Mile 0 - 48

Culturable command on main canal 39,500 acres.

Culturable command on Anavery Branch ex-R.B. main canal 11,000 acres.

Section II. 2¾ miles.

Tunnel with its approaches. No irrigation.

Section III. Main Canal from mile 51 to tail and Davangere and Malebenur Branches.

Culturable commanded areas:

Malebennur Branch	60,000 acres
Davangere Branch	95,000 "
Harpanhalli Branch	10,000 "

6.3 The dam in the spillway section is proposed to be raised to a level + 98 in the year 1958-59. This is just a few feet short of the cill level of the Right Bank Channel sluice. The phasing of the construction programme can be improved so as to obtain additional irrigation benefits one year earlier. The dam is to be raised to about + 106 with a smaller but stable cross section (masonry in flanks to be raised

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correspondingly in a similar manner). The works in Section I of the Right Bank Channel together with the Anvery Branch are to be completed simultaneously. Such a programme is practically possible in view of the fact that the additional quantities of work involved are small (appendix- 14). The work on the construction of the main canal in section (I) is already well advanced. There is one railway crossing in Section which must be contructed in time. The Public Works Department authorities are already aware of the necessity of keeping an eye on this work. With the implementation of these suggestions irrigation facilities to an area of 50,500 acres will become available one year earlier without any extra cost. In the context of the present food situation, the Irrigation Development Committee will, no doubt, when apprised of the earlier introduction of irrigation on the Right Bank Channel, take all the necessary steps to ensure that lands are in readiness to receive the benefits.

6.4 The construction of the tunnel in Section II and the finalisation of the alignment of the Right Bank Channel and the Davangere and Malebennur Branches near the Sulekere tank are the two pre-requisites for the functioning of last and the most important reach of the Canal. The urgency of an early resolution of these problems is now recognised.

6.5 The actual construction of the tunnel should not take more than two years (including six months for procurement of machinery). Hence if energetic steps are taken from now, the tunnel should be ready by mid 1959. By this time a major portion of the

Malebennur Branch and some portion of the Davangere Branch should be completed. The canal work should be completed in all respects by 1960-61, which is also the year when the dam will be completed and full storage made available.

6.6 In view of the fact that there are definite prospectus on this Project for the commencement of irrigation and power benefits without a time lag, the full quota of funds for the completion of the balance of the job needs to be made available.

7. Features of designs and construction

7.1 The design of the masonry dam fo modern practice in respect of assumptions for uplift, provision for consolidation and curtain grouting, drainage gallery, effective arrangement for dissipation of energy of the spillway discharge based on hydraulic model experiment etc.

7.2 In respect of the earth dams in the saddles the designs are based on the modern concepts of soil mechanics. This work, however, remains to be done and arrangements for field quality control need to be established.

7.3 Both in the case of the masonry dam and the earth dam it is desirable to instal instruments in the dams for collecting data on the behaviour of the dams. In the case of the masonry dam the information sought would be on temperatures, deflection, uplifts and stresses, and in the case of the earth dam for consolidation settlement and pore pressures.

7.4 Such instruments could be installed at small cost and the observations could be taken by the maintenance staff.

7.5 It has been an established practice in the Mysore State to use mortar of lime and surkhi (1:4) for constructing masonry. This mortar develops fair strength and produces water-tight masonry. The specifications for this mortar were originally evolved on the Vanivilas-sagar dam in 1892 and were later adopted on the construction of the Krishnarajsagar and other dams.

available, it would be cheaper to replace the filler part of surkhi by such sand since surkhi, which as a manufactured material is much more expensive. At Lakkavali good sa nd is not available.

7.10 Laboratory facilities should be provided at Lakkavali to conduct research work on lime-surkhi-sand mortars. Such work is bound to pay dividends. Considerable work on this subject has already been carried out by Research Departments of the Punjab, Madras etc. and several papers were contributed at the Fourth Irrigation and Power Seminar held at Hirakud.

7.11 Heavy stones, 5 feet in depth are being used for the downstream face of the spillway. These are tied down with steel bars and set in cement concrete. This work is costing Rs.4/6 per cft., the total estimated cost being over Rs.14 lakhs. It would be safe to replace this construction by use of smaller stones without any steel bars. This will give some savings.

7.12 The estimate provides for an addition of 5-10% cement to the lime surkhi mortar used for rubble masonry in the spillway section of the dam. In actual construction this is not d-one and correctly so. The resulting saving for the whole work would have been Rs. 2 lakhs.

7.13 Concrete is being used in comparatively few situations. Concrete is used in the floor of the stilling basin of the dam. Reinforced concrete is used for the construction of the superstructures (troughs) of aqueducts.

7.14 A proper design of the mix required to attain the necessary strength with the proper water-cement

ratio, use of air entraining agents to secure greater wotkability of concrete and other advantages, correct techniques for the placing of concrete to avoid segregation and honey-combing are essential to produce sound, dense and economical concrete structures. On hydraulic structures this matter is of special importance. Mixes with arbitrary proportions, even if rich in cement content, apart from being costly, do not necessarily produce the best concrete. The reinforcement in the superstructure of troughs over aqueducts can get corroded by action of water if the concrete is not sufficiently water-tight and become unsafe in the course of time. Central and field concrete laboratories are essential to ensure correct design of mixes to ensure the attainment of proper strengths and densities. These considerations will no doubt be kept in view on the concrete and reinforced cement concrete works.

7.15 In respect of canal structures it is advisable to adopt ma-sonry structures, wherever possible, to save cement and steel, particularly in view of the fact that skilled artisans for masonry works are readily available locally.

7.16 The concrete in the stilling basin is being treated with vacuum pads. A word of caution is necessary in regard to the adoption of this treatment. Apart from the specialised nature of this type of work, the advantages claimed are somewhat doubtful. This treatment was adopted on the construction of the Shasta dam in the United States of America, but on dams built subsequently this treatment has not found favour.

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7.17 The methods adopted for the construction of the Masonry dam have little scope for mechanization. The mechanical equipment used comprises air compressors for supplying air to pneumatic drills etc., mortar mills for grinding lime surkhi mortar, trucks for transport of stones etc. narrow gauge railway for transport of surkhi, mixers, pumps and other petty machinery. Cheap and plentiful labour enables this to be done at low costs. It would however seem that introduction of partial mechanization would improve the efficiency and the output of labour. Such mechanical assistance with simple equipment made in India is specially desirable where heavy leads and lifts of materials are involved.

7.18 A few pieces of heavy earth moving machines, namely, tractors, power shovel and end-dumpers are used on the dam construction. These machines, unless properly matched and made full use of, do not give economical performance. For the period of 12 months from 1.4.56 to 31.3.57 the shovel worked for 490 hours while the tractors and the dumpers worked for an average period of 830 and 790 hours only. The dumpers which were used for conveying mortar are loaded manually and the machines are idle during the period of loading which is over half an hour at a time. This operation is therefore inefficient and uneconomical. Diversion of these machines to the saddle earthdams or other suitable work is indicated.

7.19 The average daily progress of rubble masonry in the dam is about 13,000 cft. This appears to be low when compared with the maximum output of 25,000 to 30,000 cft. actually attained. In the further

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work that has to be done, the average progress will have to be pushed up so as to attain the targets.

7.20 It is a practice in the Mysore State to excavate the channels in full cutting. Elsewhere, the accepted practice is to excavate channels, wherever possible in 'balanced cutting' so as to keep down the cost of excavation to the minimum. There are good reasons for the Mysore practice. Generally the terrain along which the main canals are taken on a falling contour is rocky with little soil cover and the soils are sandy. Banks formed of such material will permit heavy seepage. Irrigation schemes involving storages and construction of canals through difficult country are costly and loss of water by seepage is to be avoided at all cost. Canals in full cuttings require practically no maintenance and no breaches can ever occur. Another advantage is that construction of numerous cross drainage works for small catchments becomes unnecessary. The discharge of such small catchments are simply admitted in the canal and let out on the other side at convenient places. All that is necessary is to provide some inexpensive dry pitching to prevent scour.

7.21 The schedule of rates provides for different rates for excavation in different strata such as soil, murum, soft rock and hard rock. On the Lakkavali project, a number of further sub-divisions of this classification are made. It is desirable that only broad classifications should be made such that there can be no doubt regarding the correct classification to avoid disputes.

tank was then no longer obligatory and alternative alignments were investigated in detail for bypassing the tank. These alternative alignments became a subject of an acute controversy, not only among the Project Engineers, but also among the members of the Standing Technical Advisory Committee and the public, so much so that the construction in Section III of the R.B. channel and the Branches was held up for months. After studying the problem, personal visits to the site and discussions with the Mysore Engineers a partial agreement was reached which enables the construction of the Right Bank Canal upto the tail and the Malebennur Branch in its entire length to be taken in hand immediately. It is understood that necessary orders in the matter have been issued by Government. There is every prospect of finalising the alignment of the Devangere Branch in the near future. Thus a major bottleneck in the construction programme has been removed and the agreed solution will also be the most economical one, resulting in a saving of the order of Rs. 20 to 54 lakhs over the other alternatives, vide appendix - 18.

9. Development of irrigation and irrigation management.

9.1 A special feature of the Lakkavali project is that the soil, health and economic surveys of the commanded areas were taken up at the same time as administrative approval was given to the project. These surveys were carried out in great detail and completed expeditiously.

9.2 These surveys were carried out under the direction of the Bhadra Reservoir Development Committee. The terms of reference of this Committee included the determination of the contribution (betterment charges) and water rates to be recovered from the agriculturists, and sending up recommendations to Government. They had to finalise the alighments of the channels, examine the nature of soils in the commanded areas and recommend the best plans for raising crops suitable to the soil. Consequent on the development of irrigation, the effect of malaria in the area and ways and means of preventing it had also be decided upon. A survey of the economic well being of the population in the area had also to be made. In short a detailed survey of the commanded area from all aspects had to be conducted and final recommendations made for avoiding and overcoming the evil effects of introducing wet cultivation and the means for achieving the best results from the project.

9.3 The following officers were appointed as members of the Committee.

(1) Revenue Commissioner, Chairman.
(2) Chief Engineer of Mysore.
(3) Director of Agriculture.
(4) Director of Public Health.
(5) Superintending Engineer, Tungabhadra Valley Circle.

The Assistant Engineer, Bhadra Reservoir

Project served as the Secretary to the Committee.

9.4 Two Sub Committees consisting of the following officers representing different departments were formed to carry our the actual work of surveys and field investigations.

(1) Assistant Commissioner.
(2) Assistant Engineer.
(3) Assistant Director of Agriculture.
(4) Health Officer.

These sub committees were assisted by appropriate subordinate staff.

9.5 The total cost of surveys for the gross commanded area of 3,77,164 acres was Rs. 3,50,000 and the work was completed well in advance of the construction work. 494 villages were surveyed, Average cost of surveys per village works out at Rs.710.

9.6 The entire area was divided into a number of zones and detailed reports for each zone together with zone map were prepared by the Sub Committees and submitted to the main Committee. A sample of a zone report and a zone map are enclosed (aapendix - 19).

9.7 A summary of the recommendations of the Bhadra Reservoir Development Committee's Report is at appendix 20.

9.8 To implement the recommendations of the Bhadra Reservoir Development Committee, Government appointed another Committee known as the Irrigation Development Committee (vide appendix - 21). This Committee is taking all the necessary measures to promote a rapid and planned development of irrigation in the project area. The Committee also deals with the problems of rehabilitation of population displaced from the

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reservoir area.

9.9 Water rates and contribution

In August 1954 Government of Mysore constituted a Committee under the Chairmanship of the Minister for Agriculture to examine the question of rationalisation of scales of water rates and contribution in respect of irrigation works in the State.

9.10 The recommendations of this Committee were accepted by Government with certain modifications (vide appendix - 22). These orders will be applicable to the Lakkavali Project.

9.11 It is thus seen that all the necessary steps have been taken to prepare a sound plan for irrigation and there is a high level Committee to implement the same. Government interest has also been secured by fixation of betterment charges and water rates. However, judging from the water rates for perennial crops that are prevalent in the Bombay State there seems to be scope for an upward revision of water rates on this Project.

9.12 For an orderly development of irrigation in accordance with the programme of crop Planning envisaged by the Bhadra Reservoir Development Committee and also to ensure economical use of water it is necessary that there should be an effective control over the management of irrigation. Particularly, in the present case limited supplies are available and any laxity in management will result in a reduction of the total acreage to be developed under irrigation and a great discontent among the cultivators situated at the tails of channels.

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9.13 In Bombay, Punjab and some other States, it is the Irrigation Department that is responsible for the management of irrigation up to the point of preparing assessment papers. Regulation of Canals has necessarily to be done by the Irrigation Department as a part of its technical work. Annual irrigation programmes, the water requirement of crops, wastage or unauthorised use of water, untoward consequences of irrigation under certain circumstances, such as water logging and salt efflorescence, are closely allied matters ultimately linked with the regulation of canals and as such ought to be under the unified control of the Irrigation Department. The Bombay Public Works Department have under the control of the Executive Engineers fully manned establishment dealing with applications from cultivators to receive irrigation for crops, the programme for issuing water to the authorised crops, preparation of assessment papers, checking malpractices by taking penal actions against offending irrigators. The Irrigation Department also conducts periodic surveys of damaged areas and subsoil water table and is responsible for preparing and executing drainage schemes. Those surveys also enable the Department to determine the areas in which perennial crops should be permitted. Thus the Irrigation Department has a control over the irrigation management in a full measure resulting in an efficient and economic use of water.

9.14 From the proceedings of the Special Committee constituted to inquire into the depletion of the Krishnarajasagar some years ago, (aapendix - 23) it is seen that it was intended to introduce on the Irwin Canal the "Block System" of irrigation prevailing in

rock cutting and numerous cross drainage works. The right bank channel involves excavation in rock cuts, as much as 60 feet deep and one 2-3/4 mile long tunnel.

10.4 The works are mostly being carried out departmentally, in a most economical manner. Stones for the dam are being supplied by piece works whose rates are determined periodically on the basis of quotations invited publicly. Lime Kankar and bricks for surkhi are acquired in the same manner. Gridding of mortar is done departmentally. The madonry work for the dam is carried out by masons and other workers employed on nominal muster rolls and the gangs are given set tasks to ensure good quality. The excavation of canals is being carried out through pieceworkers and only the masonry structures on the canals are being excavated through contractors.

10.5 Bulk of the work is thus being carried out departmentally. This has not only resulted in work of good quality at economical rate, but has afforded a high degree of construction experience to the project engineers. Departmental work needs greater strength of establishment for supervision but in Mysore little difficulty has been experienced in the matter of staffing.

10.6 The estimated cost of the project was Rs.17.75 crores. (The original project estimate of Rs.8.88 crores having been based on arbitrary ra-tes of 25% over the prewar rates, cannot be taken for the purpose of comparison). The estimate is now under revision and the cost is likely to go up to Rs.24-25 crores. This increase has resulted mainly due to increased quantities of works consequent on an increase in the

scope of the project and the important items which have led to this excess are listed below:

(a) Dam

i) Increase in the height of the dam to impound additional storage.

ii) Increase in cost of land acquisition due to increased area of submergence.

iii) Increase in the quantity of the excavation for foundations due to the necessity of deeper excavation to reach sound rock.

iv) Cost of extensive drilling and grouting for consolidation and curtain grouting.

v) Increased cost of protection works below the spillway.

(b) Canals

1. Increased work on the excavation, masonry and tunnel works due to the increased capacities of the canals to serve a greater area, the irrigated command having been increased from 1,80,000 acres to 2,34,000 acres.

(c) Increased cost of power houses and power plant due to the firm power generation having been raised from 12,682 kW. to 25,000 kW. The installed capacity for the firm power generation now being 40,4000 kW.

The general rise in prices of materials and wages of labour is also bound to reflect in the revised cost of the project.

10.7 On this project minimum use is being made of cement. Steel is being used on such items as gate structures etc. where its use is unavoidable. Some steel is being used on canal structures where there may be scope for a further saving as suggested earlier. As the construction is not mechanised the outlay on machinery has been comparatively small (app. 32-33). The construction of the tunnel, however, has to be fully mechanised and it is essential that foreign exchange to

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INTRODUCTORY

The National Development Council constituted in September 1956 the Committee on Plan Projects with the Minister for Home Affairs as Chairman with a view to securing economy and efficiency in the utilization of financial and other scarce resources in the implementation of Projects included in the second Five Year Plan. The Committee on Plan Projects later known as COPP set up Irrigation & Power Team to conduct investigations on the Lakkavali and Chambal Projects. The composition of the Team was as follows:

Shri N.V. Gadgil	Leader
Shri Lal Singh, Ex-M.P., Director of Agriculture (Retd) Punjab.	Members for the Chambal Project
Shri M.Narasimhaiya, Chief Engineer for Irrigation (Retd) Mysore.	Members for the Chambal Project
Shri C.L.Handa, ISE., formerly Director Bhakra Dam Designs Directorate	Members for the Chambal Project
Shri G.N.Pandit, ISE., formerly Superintending Engineer, Bombay.	Member f Lakkavali Project.

The Team was guided by a Consultative Committee consisting of senior engineers-

Shri N.N.Iengar, Adviser, Ministry of Iron and Steel.

Shri A.N.Khosla, Vice Chancellor, Roorkee University.

Shri M.S.Thirumale Iyengar, Chief Engineer, Hirakud.

Shri R.K.Gupta, Managing Director, National Projects Construction Corporation.

Shri D.S.Borker worked as Secretary to the Consultative Committee as also the Irrigation & Power Team.

2. The Irrigation & Power Team was required to make a study of various aspects of the two Projects with special reference to:

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to :

(a) Utilisation of trained personnel and materials;

(b) Utilisation of machinery and equipment;

(c) Construction of Plant lay-out;

(d) Adequacy of original estimates and designs as evidenced from actual construction of the Project;

(e) Phasing of construction with a view to studying whether:

(i) Timely utilisation of benefits accruing from the Project has been ensured;

(ii) it is possible to accelerate accrual of benefits.

(iii) benefits could be increased by rephasing the project at this stage;

(f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

(g) The effect of the above study on the financial results of the Project, if any

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the Project.

3. The main burden of the investigation on irrigation side of Lakkavali Project fell on Shri G.N. Pandit who was specially selected for this work. Shri N.N. Iengar, Electrical Advisor, Ministry of Iron & Steel, and a Member of the Consultative Committee on Irrigation & Power dealt with power aspects of the Project. Both of them visited the Project site a number of times for observation and collection of relevant data. It was followed by a visit by the Leader and Members of the Consultative Committee who held discussions with the Chief Engineer (Irrigation) and other officials of the Mysore Government. The tentative conclusions of the Team were formulated in May 1957 and the draft report was placed before the Consultative Committee towards the last week of August 1957. The report as modified was forwarded to the Mysore Government who were in general agreement with the recommendations made by the Team.

4. We take this opportunity to record our gratitude to Mysore Government for the facilities extended for the conduct of investigations and spirit of accommodation shown by the Chief Engineers, Irrigation and Electricity and other officials. We are specially indebted to Shri Indarjit Singh, Secretary, COPP who took active part in the deliberations of the Team and gave generously of his time and knowledge specially on financial and administrative aspects of the Report.

1. SCOPE OF THE PROJECT

1.1 The dependable annual yield is 1,00,000 mcft. at the dam site, range of variation being 75,000 mcft - 1,50,000 mcft. The utilisation for irrigation & power put together is 90% of this yield. All possible avenues have been explored in order to maximise generating capacity of the project, e.g.:

(a) The project is designed to generate power from discharges released into the river bed and also from the discharges released into the Right Bank and Left Bank channels. The total installed capacity is 40,400 KW.

(b) It is also planned to utilise water released for irrigation to the maximum extent, by reusing for additional irrigation, the re-water generated into nallas from the irrigated tract. This is proposed to be achieved by constructing pick up weirs across them. The total area irrigated would be 2,34,000 acres.

1.2 There is a possibility of generating more power by slight modifications in the design and in the arrangements under which it has been planned in the manner indicated below:-

(i) During good years surplus water is available. Besides, in the initial years, irrigation will not have developed fully and a proportion of the water earmarked for irrigation can be utilised for generation of additional power and energy by discharging this surplus into the river bed. It is suggested that during negotiations with the successful tenderers for the supply of machinery, maximum overload capacity for all the generating units be called for and incorporated in the final designs of

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the units. About 6,000 kW overload capacity may be feasible.

(ii) The fullest use of the supplies in the Lakkavalli storage for power can, however, only be secured, if the regulation of water permits certain balances to be left over in the reservoir in good years to be utilised in subsequent lean years, this increasing the level of firm energy generated annually. The utilisation of the waters of the Bhadra river is subject to an understanding which was arrived at in December, 1945, through the good offices of the Government of India, among the then Mysore, Madras and Hyderabad States. The two States now concerned are Andhra and Mysore. According to Clause (2) of this agreement (vide app.2), out of the quantity of water impounded in the reservoir every year, 57,000 mcft only could be utilised for irrigation on this project and the balance should be released into the river undiminished within the same year. By implication, it appears that the said Clause operates to prevent Mysore State from maintaining a carry over in surplus years. The design of the Dam has been so prepared as to permit carry over to be maintained. The carry over, while beneficial to Mysore, need not affect adversely the projects downstream. This is, however, a matter which requires joint consultations and the Team is glad to report that Both Governments are agreeable to further discussions. It is suggested the

Irrigation & Power Ministry may provide the machinery for reaching final decisions.

2. ADMINISTRATION

2.1 The distinctive features of the administration of the Project are as follows:-

(a) The ratio of the cost of establishment to the total cost of the projects works out at 4% which is considerably lower than the 10-12% ratio considered as desirable by the Nangal Seminar of Engineers. This may be mostly attributed to the lower scales of pay prevalent in the Mysore State as compared to other States, and partly it is due to certain under-staffing of the Project to which a reference will be made later.

(b) The management of the Project is carried out with the assistance of a Consultative Committee of Engineers, a High-powered Committee of Administrators and Engineers and the Chief Engineer, Major Irrigation (South) who is also in charge of the Sharavati Valley Hydro Electric Scheme and some other projects of the State.

2.2 The unique feature of these arrangements is the constitution of a Consultative Committee consisting of the two Chief Engineers of the State, six retired Chief Engineers of the State, retired Director of Hydraulic Research, Chief Engineer, Electricity Department, Secretary to the Government in the P.W.D. and the Under Secretary to Government, P.W.D., who acts as Secretary of the Committee. The technical decisions of the Committee are taken at a preliminary meeting under the chairmanship of the Chief Engineer concerned. The draft resolution of

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this preliminary meeting are then ratified by the regular meeting of the Standing Technical Advisory Committee presided over by the Minister, P.U.D. According to convention the decisions of the Standing Technical Advisory Committee are invariably accepted although functionally the Committee has only the right to advice.

2.3 The administrative details connected with these decisions are then considered fully by a high-powered committee of which Minister, P.U.D. is the Chairman. The Secretaries to Government in the Public Works, Finance and Development Departments, President, Stores Purchase Committee, two Chief Engineers and Shri M.Narasimhaiya act as members. The resolutions passed by this high-powered committee constitute an authority for implementation. The effect of consideration given by this Committee is that routine departmental procedures are cut across at origin, and a sense of expedition is introduced into the implementation of the Project. The high-powered Committee is virtually the Control Board for the Project.

2.4 The actual administration of the Project is with the Chief Engineer, Major Irrigation (South). The detailed working of the Project is supervised by a Superintending Engineer.

2.5 The three-tier arrangement above ensures that practical and administrative issues are given due consideration by persons qualified to undertake such responsibility. The arrangements may look, on the face of it, somewhat complicated but in actual operation they have considerable advantages over

arrangements made for the execution of Projects in other States. The distinctive feature is the manner in which the available engineering talent in the State has been harnessed for the discussion of technical issues arising from the Project. The responsibility for details of designs and technical execution is thus shared between the existing Chief Engineers and the other engineering talent in the State. This enhances the confidence of the administrative agencies in the final designs and plans for execution which, in turn, enables expeditious implementation. Ad hoc consultations are decided upon by designing and executing authorities elsewhere as difficulties arise, but there is no continuous technical scrutiny by persons not burdened with the daily routine of designing and administration involved in the execution of the projects. This feature of the Lakhavali Project is worth copying and certain proposals, in this behalf, have been made by the Team in its report relating to the Chambal Project.

2.6 A reference has already been made to some under-staffing in the Project. The following suggestions are being made for strengthening its administration. They have been generally discussed with the project authorities of the State Government, and are acceptable to them. The justification for each proposal is briefly indicated below. The Team has been constrained to suggest additional expenditure in the interest of more effective execution of the Project, as follows:-

(i) The work on the Tunga Anicut Project is nearly completed, but the tempo of the progress on the Lakhavali Project needs to

be intensified immediately. The large and important works of the 2¾ miles long tunnel on the Right Bank Channel, and the excavation of the Malebennur and Davangere Branches are to be started immediately and proceeded with at a rapid pace so as to synchronise with the completion of the Lakkavalli dam. These works are situated at a distance from the site of the Lakkavalli dam. The construction of the dam is reaching a stage when the construction of the power houses, installation of the turbines and the generating units, installation of sluice gates and crest gates etc., will have to be undertaken according to schedule. These works will need considerable personal attention of the Present Superintending Engineer. It is necessary that an additional post of Superintending Engineer should be created to take charge of the construction of the channel tunnel and the Malebennur and Davangere Branches. The total annual expenditure on this Project, hereafter, of 4-4½ crores of rupees is sufficiently heavy to justify the creation of a Second Circle. A good deal of preliminary work has to be done in connection with the construction of the tunnel and the actual construction will need constant attention at a sufficiently high level. It is also desirable, in the interest of the timely completion of this work which has already

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been delayed, that the headquarters of the Second Superintending Engineer should be fixed within an easy reach of the tunnel. It is understood, as a result of informal discussion with the representatives of the Mysore Government, that they accept the justification for the creation of an additional post of a Superintending Engineer.

(ii) The arrangements for preparing designs need revision. The present practice is that both major and minor designs are prepared in the offices of the Executive Engineers and approved by the Chief Engineer. The latter has no central Designs Office. Since major projects other than Lakkavalli are also being taken up for execution and it has been found, in actual practice, that major changes have to be made in designs, it is suggested that a Central Designs Office may be constituted under the Chief Engineers. This office should attend to major changes in design. There will also be day to day supervision of the evolution of designs by the Chief Engineer on whom ultimately rests the responsibility of approving them and for placing them before the Consultative Committee. It will also be possible for type designs to be standardised for other works. The minor designs may continue to be prepared by the Executive Engineers. It will also be necessary to locate a small designs cell of the Central Designs Office at the headquarters of the Superintending

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Engineer in order to maintain liaison with field officers and to render such local assistance as may be necessary to the Executive Engineers engaged on minor designs. The exact staff requirements for the designs organisations suggested above would require to be worked out in detail.

(iii) The design of the spillway and the stilling basin and certain other features of the dam were based upon the results of several hydraulic experiments carried out the Research Station at Krishnarajasagar. This station is under the administrative control of the Chief Engineer, General. The current procedure is that the estimate for the cost of conducting the model experiment has to be approved by the Chief Engineer, General. Also, the results of the tests are communicated by the Director, Research Station to the Chief Engineer, General, who transmits them to the Special Chief Engineer in charge of the Project. This procedure is lengthy as an unnecessary stage in the form of C.E.(Gen) as the Controlling Officer is introduced in the transmission of papers. As the cost of the model studies is met with from the Project funds, the sanction to the estimates should be accorded by the Project authorities, under whose control and guidance the Research Officers could maintain close contact with the Project Engineers, and readily visit the site of the work if necessary and promptly communicate the results of the tests to the Project authorities.

(iv) The present laboratory facilities for the field research work and tests on this Project are not adequate. This is particularly necessary as the work is being mostly executed departmentally. The quality of work and strict observation of specifications have to be continuously watched and ensured. The Team would suggest that a separate organisation headed by an experienced senior Executive Engineer, directly responsible to the Chief Engineer, should be created for the purposes of inspection. This organisation should also be in charge of laboratory tests and should advise on variations required in the designs and techniques of concrete, mortars and earth-works etc. The organisation will need a moderate staffing but its ultimate benefit would be well worth the expenditure incurred as is clear from the functioning of such organisations elsewhere.

(v) There has been some difficulty in obtaining experienced store-keepers. When the work on the construction of the tunnel is under-taken, the responsibility for store-keeping will increase. The Team suggests that the Mysore Govt., either itself or with the assistance of a Commerce College conduct a short course for training Store-keepers and Clerks.

3. PHASING OF CONSTRUCTION PROGRAMME

3.1 In a multipurpose or irrigation project it is to an economic advantage if the construction programme is so arranged that benefits start accruing even before the project is fully completed.

3.2 In the Lakkavalli project the construction programme is such that a progressive accrual of irrigation benefits is secured (appendix -3)

(a) The sluice of the Left Bank Channel is at +95 above river bed. The dam was raised above this level in 1955-56. Simultaneously the Left Bank Channel was completed and opened for irrigation (13,500 acres).

(b) The sluices of the Right Bank Channel are located at M.L. +100. The Right Bank Channel is divided into the following three sections :-

Section I. Mile 0 - 42

Culturable command on main canal, 30,600 acres.

Culturable command on Anavery Branch Dr-M.C. main canal 11,000 acres.

Section II. 2½ miles.

Tunnel with its approaches.

No irrigation.

Section III. Main Canal from mile 61 to tail and Davangere and Malebennur Branches.

Culturable commanded areas:

Malebennur Branch	60,000 acres
Davangere Branch	95,000 "
Harpanhalli Branch	10,000 "

3.3 The dam in the spillway section is proposed to be raised to a level +83 in the year 1958-59. This is just a few feet short of the sill level of the Right Bank Channel sluice. The phasing of the construction programme can be improved so as to

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obtain additional irrigation benefits one year earlier. The dam is to be raised to about +100 with a smaller but stable cross section (masonry in flanks to be raised correspondingly in a similar manner). The work in Section I of the Right Bank Channel together with the Anvery Branch are to be completed simultaneously. Such a programme is practicable in view of the fact that the additional quantities of work involved are small (appendix- 4). The work on the construction of the main canal in Section (I) is already well advanced. There is one railway crossing in this Section which must be constructed in time. With the implementation of these suggestions irrigation facilities to an area of 50,000 acres will become available one year earlier without any extra cost. In the context of the present food situation, the Irrigation Development Committee will, no doubt, when apprised of the earlier introduction of irrigation on the Right Bank Channel, take all the necessary steps to ensure that lands are in readiness to receive the benefits.

3.4 The construction of the tunnel in Section II and the finalisation of the alignment of the Right Bank Channel and the Devangere and Halebannur Branches near the Sulekere tank are the two pre-requisites for the functioning of last and the most important reach of the Canal. The urgency of an early resolution of these problems is now recognised.

3.5 The actual construction of the tunnel should not take more than two years (including six months for procurement of machinery). Hence if energetic steps are taken from now, the tunnel should be ready

by mid 1959. But this time a major portion of the Holobennur Branch and some portion of the Davangere Branch should be completed. The canal work should be completed in all respects by 1960-61, which is also the year when the dam will be completed and full storage made available.

3.6 In view of the fact that there are definite prospects on this Project for the commencement of irrigation and power benefits without a time lag, the full quota of funds for the completion of the balance of the job needs to be made available.

4. Features of designs and construction

4.1 The design of the masonry dam follows modern practice in respect of assumptions for uplift, provision for consolidation and curtain grouting, drainage gallery, effective arrangement for dissipation of energy of the spillway discharge based on hydraulic model experiment etc.

4.2 In respect of the earth dams in the saddles, the design are based on the modern concepts of soil mechanics. This work, however, remains to be done and arrangements for field quality control need to be established as suggested.

4.3 It is desirable to install instruments in the masonry and the earth dams for collecting data on their behaviour. The information sought for the masonry dams would be on temperatures, deflection, uplifts and stresses; and for the earth dams, it will be on consolidation settlement and pore pressures. Such instruments could be installed at a small cost and their observation entrusted to the maintenance staff.

4.4 It has been an established practice in the Mysore State to use mortar of lime and surkhi (1:4) for constructing masonry. This mortar develops fair strength and produces water-tight masonry. The specifications for this mortar were originally evolved on the Vanivilas-sagar Dam in 1902 and were later adopted on the construction of the Krishnarajasagar and other dams.

4.5 The masonry with the lime-surkhi mortar is found water tight and economical. Inspite of the comparatively heavy cost of stone at Lakkavali as Rs.50-60 per 100 cft., due to long lands, the average cost of rubble masonry for the hearting of the dam is not exceeding Rs.1.25 per cft. exclusive of overhead charges.(Pl.vide app.G). Test holes drilled

in the --

body of the dam could take only an insignificant amount of grout, showing the excellence of the masonry.

4.6 There is no laboratory control on the raw materials used for the manufacture of lime and surkhi during the stage of construction. Results of tests of the mortar cubes performed, continuously, show a wide variation of strengths.(Vide App.6). If lime kankar and soils used in the manufacture of mortar are subjected to tests it would be possible to standardise the product and reduce the variations of the mortar strengths to narrower limits. Such standardisation will lead to the adoption of higher permissible stresses in the masonry and permit adoption of more economical cross sections of dams. Therefore, it it suggested in para 2.6(iv) to provide a suitable organisation to control this very important aspect. This organisa-tion provided with a well equipped laboratory should also be able to design the concrete mixes in accordance with modern scientific methods, so as to obtain mixes of required workability and strength with the least possible amount of cement.

4.7 A few pieces of heavy earth moving machines, namely, tractors, power shovel and end-dumpers are used on the dam construction. These machines, unless properly matched and made full use of, do not give economical performance. For the period of 12 months from 1.4.66 to 31.3.67 the shovel worked for 490 hours while the tractors & the dumpers worked for an average period of 830 and 720 hours only. The dumpers which were used for conveying mortar are loaded manually and the machines are idle during the period of loading which is over half an hour at a time. This operation is therefore inefficient & uneconomical. Diversion of these machines to the middle earthdams or other suitable work is indicated.

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4.8 On the Lakkavalli Project, a number of further sub-classifications of each of the main strata (viz. soil, murum, soft rock and hard rock) is introduced. As admitted by Executive Engineers in charge of works, it is not possible to follow these numerous classifications in actual practice. Therefore, the piece-workers are paid at average rates. It is, therefore, desirable to follow only few broad classifications which would minimise doubts regarding correctness of classifications and avoid the possible disputes or abuse.

6. Canal works needing urgent attention.

6.1 Tunnel in mile 63 of the Right Bank Channel -

Speedy construction of this tunnel has become a matter of crucial importance. Major portion of irrigation included in the project is in the command of the Halebennur and Davangere Branches, which take off from the Right Bank Channel beyond the tunnel. Hence unless the tunnel is completed expeditiously the development of irrigation will be seriously throttled. An indent for the tunnel construction machinery costing Rs.39 lakhs is at the moment pending with the Government of Mysore.

6.2 Appendix 7 shows a scheme for constructing the tunnel together with a list of equipment which is considered sufficient for completing it in 18 months. According to this scheme, the investment in the tunnel machinery can be reduced by Rs.10 lakhs.

6.3 Alignment of the Right Bank Channel and the Davangere and Halebennur Branches near the Sulekere tank:-

In the original project, provision was made for the Right Bank Channel, after emerging from the tunnel, to drop in the existing Sulekere tank and to take off the two branches from this tank. The tank is a fairly large one and is formed by a short earth dam constructed a few centuries ago. As the levels adopted in the original project were not quite suitable, it was subsequently decided to take off the Right Bank Canal from the Lakkavalli dam at a level ten feet higher than originally intended. Further increase in the level at the tail end of the tunnel was gained by easing certain curves and thereby shortening its length. Dropping the canal into the tank was then no longer obligatory and alternative alignments were investigated in detail for bypassing the tank. Those alternative alignments which became a subject of some contro-
-versy, were under consideration. In the

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meeting the construction of Section III of the D.D. channel and the Barrages was consequently held up. After studying the problem, personal visits to the site and discussions with the Hydro Engineers, the Team has recommended proposals contained in appendix ( ) adoption of which results in a saving of Rs.20-30 lakhs over all other possible alternatives.

6. Development and Management of irrigation.

6.1 A special feature of the Lakkavali project is that the soil, health and economic surveys of the commanded areas were taken up at the same time as administrative approval was given to the project. These surveys were carried out in great detail and completed expeditiously.

6.2 These surveys were carried out under the direction of the Bhadra Reservoir Development Committee. The terms of reference of this Committee included the determination of the contribution (betterment charges) and water rates to be recovered from the agriculturists, and sending up recommendations to Government. They had to finalise the alignments of the channels, examine the nature of soils in the commanded areas and recommend the best plans for raising crops suitable to the soil. Consequent on the development of irrigation, effect of malaria in the area and ways and means of preventing it had also to be decided upon. A survey of the economic well-being of the population in the area had also to be made. In short a detailed survey of the commanded area from all aspects had to be conducted and final recommendations made for avoiding and overcoming the evil effects of introducting wet cultivation, and the means for achieving the best results from the project.

6.3 The following officers were appointed as members of the Committee.

(1) Revenue Commissioner — Chairman.
(2) Chief Engineer of Mysore
(3) Director of Agriculture
(4) Director of Public Health
(5) Superintending Engineer, Tungabhadra Valley Circle.

The Assistant Engineer, Bhadra Reservoir Project served as the Secretary of the Committee.

6.4 The Sub-Committee consisting of the following officers representing different departments were formed

to carry out the actual work of surveys and field investigations.

(1) Assistant Commissioner
(2) Assistant Engineer
(3) Assistant Director of Agriculture
(4) Health Officer.

These sub-committees were assisted by appropriate subordinate staff.

6.5 The total cost of surveys for the gross commanded area of 3,77,164 acres was Rs. 3,50,000 and the work was completed well in advance of the construction work. 494 villages were surveyed. Average cost of surveys per village works out at Rs. 710.

6.6 The entire area was divided into a number of zones and detailed reports for each zone together with zone map were prepared by the Sub-Committees and submitted to the main Committee. A sample of a zone report and a zone map are enclosed (Appendix 9).

6.7 A summary of the recommendations of the Bhadra Reservoir Development Committee's report is at appendix 10.

6.8 To implement the recommendations of the Bhadra Reservoir Development Committee, Government appointed another Committee (vide appendix 11). This Committee is taking all the necessary measures to promote a rapid and planned development of irrigation in the project area. The Committee also deals with the problems of rehabilitation of population displaced from the reservoir area.

6.9 <u>Water rates and contribution</u>

In August 1954 Government of Mysore constituted a Committee under the Chairmanship of the Minister of Agriculture to examine the question of rationalisation of scales of water rates and contribution in respect of irrigation works in the State.

6.10 The recommendations of this Committee were accepted by Government with certain modifications (vide appendix 12). The orders will be applicable to the

Lakhavali Project.

6.11 It is thus seen that all the necessary steps have been taken to prepare a sound plan for irrigation and there is a high level committee to implement the same. Government interest has also been secured by fixation of betterment charges and water rates. However, judging from the rates for perennial crops that are prevalent in contiguous States, there seems to be scope for an upward revision of water rates on this Project.

6.12 For an orderly development of irrigation in accordance with the programme of crop Planning envisaged by the Bhadra Reservoir Development Committee and also to ensure economical use of water it is necessary that there should be an effective control over the management of irrigation. Particularly, in the present case limited supplies are available and any inadequacy in management will result in a reduction of the total acreage to be developed under irrigation and thus the possibility of discontent among cultivators situated at the tails of the channels may arise.

6.13 In Bombay, Punjab and some other States, it is the Irrigation Department that is responsible for the management of irrigation upto the point of preparing assessment papers. Regulation of canals has necessarily to be done by the Irrigation Department as a part of its technical work. Annual irrigation programmes, the water requirement of crops, wastage or unauthorised use of water, untoward consequences of irrigation under certain circumstances, such as water logging and salt efflorescence, are closely allied matters ultimately linked with the regulation of canals and as such ought to be under the unified control of the Irrigation Department. The Bombay Public Works Department have under the control of the E cutive Engineers fully manned establishment dealing with

applications from cultivators to receive irrigation for crops, the programme for issuing water to the authorised crops, preparation of assessment papers, checking malpractices by taking penal actions against offending irrigators. The Irrigation Department also conducts periodical surveys of damaged areas and subsoil table and is responsible for preparing and executing drainage schemes. These surveys also enable the Department to determine the areas in which perennial crops should be permitted. Thus the Irrigation Department has a control over the irrigation management in a full measure resulting in an efficient and economic use of water. Therefore it is strongly recommended that the Government of Mysore may follow the Bombay's pattern as far as possible.

6.14 From the proceedings of the Special Committee constituted to inquire into the depletion of the Krishanarajasagar some years ago (appendix 13) it is seen that it was intended to introduce on the Irwin Canal the "Block System" of irrigation prevailing in Bombay, with suitable modifications, but, for various reasons, this has not been done nor any other system introduced and haphazard irrigation has resulted. Such a state of affairs should not be allowed to occur on the new areas in the command of the Lakkavali Channels.

6.15 Now, that irrigation has commenced on the Left Bank Channels, immediate steps need to be taken as indicated above.

7. Power Generation.

7.1 In order to utilise the waters stored in the Bhadra reservoir for power generation as well, two power stationsare being constructed - One at the right bank of the river with two machines each rated at 7200 kW utilising the irrigation waters to be discharged into the right bank canal, and the other at the left bank with one machine of 2000 kW utilising the waters to be discharged into the left bank canal and two machines of 12000 kW each discharging waters into the river below the dam.

7.2 An average daily discharge of 627 cusecs has to be maintained in the river below the dam-500 cusecs for irrigation of lands under the Bhadra Anicut (which is located about 8 miles downstream of the Dam.) and 127 cusecs for industrial and domestic water supply below the Anicut. This water is proposed to be utilised for power generation in the two 12,000 kW units which may be called river-bed units.

7.3 It is found that in a year (1937-38) of average run-off, commencing with reservoir level at 123 on 1st July, full irrigation requirements under the two canals can be met throughout the year and a discharge of 627 cusecs can be maintained throughout the year in the river below the Dam. Besides, a surplus of 23826 m.Cft of water will have to be let out in the river bed in order to bring down the lake level to 123 by the end of June as there should be no carry-over according to the terms of the agreement. During a lean year (1938-39) however, it would not be possible to maintain a discharge of 627 cusecs in the river bed right through the year. From December 15 to J 15, this discharge will have to be limited to the natural inflow in the river which is much below 627 cusecs. It is understood

from the P.W.D. Engineers that river discharges in a lean year could be reduced to 327 cusecs during the wet months so as to increase the flow in the dry period (Dec.-June) of the year.

7.4 The two power stationswill feed into the existing transmission grid of the State. As the discharges into the two canals have to be continuous, the power generated in the three units discharging into the canals will also be continuous. The discharge through the river-bed units can however, be varied so that the station operates during the system peak hours only. It has been found that even in the leanest year, it is possible to develop a firm peak output of 25,000 kW from the proposed installation of generating units. The canal units will be operating continuously while the river bed station would operate during the morning and evening peak hours only.

7.5 In order to enable the Mysore power system to accept a firm additional load of 25000 kW at the system load factor, it would be necessary to carry over waters from surplus years to lean ones or to supplement the energy resources at Lakkavalli by those available in the rest of the Mysore State power grid.

7.6 As the system load grows up, the peaks of the load curve become sharper and the energy in a given peak cut-off decreases. Consequently, with the same quantity of water, it would be possible to generate at Lakkavalli to meet a peak demand of more than 25,000 kW. It is not possible to put in an additional penstock pipe now. However, absence of this provision is not considered to be an appreciable loss of resources in view of the fact that a very large generating station is projected to be developed in the state at Sharavathi during the 2nd Plan period. It is suggested that

during the final negotiations with the successful tenderer, as much overload capacity as ispracticable should be called for and incorporated in the final designs of the generating units. It is desirable to provide some extra penstock openings when building such dams in future. It will generally be found in expanding integrated power systems, that as the systems expand, additional hydro generating capacity can be utilised economically with the same water resources.

7.7 As it is not possible to forecast the nature of a monsoon season in advance, it would appear to be necessary to regulate the reservoirlevels in the following pattern. As the monsoon months are generally from July to September, the storing of the monsoon inflows in the reservoir should be regulated so as to have it full (level 186) on the 1st October. The lake may then be depleted to the lowest possible by the following June and then the level built up again to 186 during July to September. If it is found during July that the monsoon may not be normal during that year, the discharge in the river bed could be suitably reduced so that the lake level could be built up as near to 186 as possible by the end of the South West monsoon.

7.8 There is no doubt that the power and energy from this project would be utilised as soon as it is made available owing to the acute power shortage prevailing in the State.

8. Construction Costs.

8.1 The rates of wages of staff and labour are a feature of the economy of the Mysore State. The cost of masonry and of canal excavation isremarkably low. This is due, in no small measure, to the large number of labourers, skilled and unskilled who have been employed on masonry and excavation works for years together and have attained a high degree of efficiency.

8.2 The rates for the main items of construction are given in appendices 14 - A to E.

8.3 The cost of Rs. 940 per acre of irrigated area and Rs. 915 per kW of firm power may appear to be high having regard to the low rates of construction prevailing in the State. The factors contributing to the high overall cost are:-

(a) High cost of constructing storage dams as against the comparatively low cost of diversion weirs where the canal supplies can be met with from the run-of from the river.

(b) High cost of constructing the main canals, which pass through difficult terrain, involving heavy rock cutting and numerous cross drainage works. The right bank channel involves excavation in rock cuts, as much as 60 feet deep and one 2¾ mile long tunnel.

8.4 The works are mostly being carried out departmentally in an economical manner. Stones for the dam are being supplied by piece workers whose rates are determined periodically on the basis of quotations invited publicly. Lime Kankar and bricks for Surkhi are acquired in the same manner. Grinding of mortar is done departmentally. The masonry work for the dam is carried out by masons and other workers employed on nominal muster rolls and the gangs are given set tasks to ensure good quality. The excavation of canals is being carried out through pieceworkers and only the masonry structures on the canals are being excavated through contractors.

8.5 Bulk of the work is thus being carried out departmentally. This has not only resulted in a work of good quality at economical rate, but has afforded a high degree of construction experience to the project engineers. Departmental work needs greater strength of establishment for supervision but in Mysore little difficulty has been experienced in the matter of staffing.

8.6 The estimated cost of the project was Rs. 17.75 crores. (The original Project estimate of Rs. 8.88 crores having been based on arbitrary rates of 25% over the prewar rates, cannot be taken for the purpose of comparison). The estimate is now under revision and the cost is likely to go up to Rs. 24-25 crores. This increase has resulted mainly due to increased quantities of works consequent on an increase in the scope of the project and the important items which have led to this excess are listed below:-

(a) Dam

1. Increase in the height of the dam to impound additional storage.
2. Increase in cost of land acquisition due to increased area of submergence.
3. Increase in the quantity of the excavation for foundations due to the necessity of deeper exwavation to reach sound rock.
4. Cost of extensive drilling and grouting for consolidation and curtain grouting.
5. Increased cost of protection works below the spillway.

(b) Canals

Increased work on the excavation, masonry and tunnel works due to the increased capacities of the canals to serve a greater area, the irrigated command having been increased from 1,80,000 acres to 2,34,200 acres.

(c) Increased cost of power houses and power plant due to the firm power ge ration having been raised from

12,682 kW to 25,000 kW, the installed capacity for the firm power generation now being 40,400 kW.

The general rise in prices of material and wages of labour is also bound to reflect in the revised cost of the project.

8.7 On this project minimum use is being made of cement. Steel is being used on such items as gate structures etc., where its use is unavoidable. Some steel is being used on canal structures where there may be scope for a further saving. As the construction is not mechanised the outlay on machinery has been comparatively small (app. 15-16). The construction of the tunnel, however, has to be fully mechanised and it is essential that foreign exchange to the tune of Rs. 30-40 lacs be made available.

8.8 In spite of the cost of the dam and the heavy cost of Canals, the project is expected to be self-supporting. It has certain particularly good features such as detailed investigations for localization of irrigation, economy in the use of steel and cement, conservation of foreign exchange involved in the purchase of foreign machinery and materials etc. which could be adopted by other projects where circumstances permit. This project deserves to be assured of timely and adequate grants to enable its completion within the target date.

H.V. GADGIL,
Leader.
16-11-57

D.S. BOREER,
Secretary.
16/11/57
November 16, 1957.

COMMITTEE ON PLAN PROJECT

STUDY TEAM FOR COMMUNITY PROJECTS
AND
NATIONAL EXTENSION SERVICE

सत्यमेव जयते

DRAFT RECOMMENDATION

GOVERNMENT OF INDIA
PLANNING COMMISSION

1957

LIST OF ANNEXTURES TO LAKKAVALI REPORT

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" E Rate analysis for cut-stone masonry for the spillway section of dam in 1:2 cement mortar including anchoring the stone with 3/8" to ½" bars.

" F Rate analysis for face-stone masonry for Dam in 1:4 Lime Surkhi Mortar.

" G Actual cost of manufacturing Lime Surkhi Mortar(1:4)

" H Estimated rates for rubble masonry in Surkhi Mortar (1:4) in Dam, for different heights.

15. Statement of Plant and machinery on Lakkavali Project.

16. List of Machinery required for Hiremalali Tunnel Works - Right Bank Channel.

APPENDIX No. 1

Principle features of Lakkavali Project.

(a) Dam

1.	Location	Latitude 13°42' Longitude 75°38'20"

The site is at a narrow gorge through which the Bhadra river flows, about one mile west of the Lakkavali village, district-Chikmagalur.

2.	Catchment area	760 sq. miles.
3.	Annual rainfall in the catchment.	46 to 202 inches.
4.	Maximum flood experienced (computed)	94,600 cusecs.
5.	Design flood.	1,20,000 cusecs.
6.	Height of masonry dam over deepest founda--tion.	247 feet.
7.	Length of dam at F.R.L.	1,385 feet.
8.	Length of earth dam in first saddle on left bank	1,400 feet.
9.	Length of earth dam in second saddle on left bank.	780 feet.
10.	Area of water spread at F.R.L.	45.53 sq. miles
11.	Maximum stress developed in masonry of dam.	10 T./sq. foot.
12.	Effective storage capacity of reservoir above +100	63,000 m.c.ft.
13.	Free board (masonry dam)	8 feet.
14.	Sill of irrigation sluice on right bank (2 Nos.8'x15')	+ 100 (above river bed)
15.	Sill of irrigation sluice on left bank (6' x 12')	+ 36 (above river bed)
16.	Spillway: Gated spillway with crest gates 4 Nos.60' x 23½'	
17.	Sill of undersluices (2 Nos. 6' x 15')	+ 45 (above river bed)

(b) Power Plant

		Right bank units	River bed units	Left bank units.
1.	No. of penstocks	2	2	1
2.	Dia. of penstocks in feet.	10	10	6
3.	K.W. capacity of each machine.	7,200	12,000	2,000
4.	Total K.W. installed capacity.	14,400	24,000	2,000
5.	Total K.W. installed capacity of Project.		40,400	
6.	Firm peak in K.W.		25,000	

(c) Canals.

1.	Full designed discharge of left bank canal at head.	335 cusecs.
2.	Full designed discharge of right bank canal at head.	2,500 cusecs.
3.	Total length of Canals.	220 miles.
4.	Total irrigated area.	2,34,200 acres.

SHEET III (Page 7)

With regard to the technical details for settlement provided under clause (14) of the Madras-Hyderabad Agreement, Hyderabad requests very early action with a view to settlement of these details without which there will be the possibility of delays at different stages of the Project.

Sd/- ALI NAWAS JUNG Sd/- A.N.KHOSLA 24-12-1945 Sd/- S.M.YOUNUS 24-12-1945

SHEET IV (Page 8)

Hyderabad reiterates her request for the setting up of a tribunal for the final apportionment of the Tungabhadra waters and requests for a very early action in this respect.

Sd/- ALI NAWAZ JUNG Sd/- A.N.KHOSLA 24-12-1945 Sd/- S.M. YOUNUS 24-12-1945

APPENDIX NO. ~~16~~ 5

MYSORE P.W.D.

Statement showing yearwise working rates of Rubble Masonry in Surkhi Mortar 1:4

Year	Quantity	Cost	Average working rate
1951-52	3,66,227 Cft.	3,49,654	0-15-1 per cft.
1952-53	7,06,796 "	6,54,969	0-14-10 2/3 "
1953-54	12,13,295 "	12,29,044	1-0-2. 2/3 "
1954-55	27,65,059.6 "	30,37,027	1-1-5 "
1955-56	23,27,513 "	26,26,986	1-1-1½ "
1956-57 to end of March.	22,44,365 "	24,31,006	1-1-4 "

Sd/- Executive Engineer,
No.1 B.R.C.Division.

(A) Mysore may proceed with the construction of Sacrebyle Anicut on the Thunga River subject to the condition that pending the construction of the Thungabhadra Dam. Mysore shall not extract supplies from the Thunga at the Sacrebyle Anicut during low flow period when such extraction is likely to adversly effect the existing pre-Moghul irrigation. To ensure that the spirit of this clause is compiled with regulation rules in this respect shall be framed by the Chief Engineers of the three Governments.

(b) With regard to allowance for the rights of the Government of Mysore to draw off water for factories and towns from the water courses in the Thungabhadra basin or the rights of the riparian land owners to take water to which they may be entitled under the law or for the Minor tanks in the Thungabhadra Basin, Hyderabad agrees, to a specific figure limited to 4,000 M.C.ft. of water.

(C) Regarding the quantity of 57,000 M.C.ft. exclusive of evaporation losses at the Lakkavali Reservoir under clause (1) of the Mysore-Madras Agreement, Hyderabad does not commit herself either way to its acceptance or otherwise and shall be free to act under clause (10 sub-para (2) of that Agreement. Subject to the above, Hyderabad does not object to the construction of the Lakkavalli Reservoir.

(D) The extension of irrigation from the existing Bhadra Anicut provided for under clause (i)(b) of the Madras-Mysore Agreement, shall be permitted subject to the same condition as laid down for the irrigation from the Sacrebyle scheme mentioned under (A) above.

(E) The Governments of Hyderabad, Madras and Mysore recognise the claims of Sangli, Bombay and any other

riparian areas (excluding those of Mysore, Madras and Hydorabad which are already covered by the two Agreements between Madras and Hydorabad and Madras and Mysore) to an equitable share of waters which shall be decided by a Tribunal set up by the Government of India for the purpose of final apportionment of the Thungabhadra water between all the interested parties; further the three Governments agree that the schemes under the two Agreements mentioned above are not intended to prejudice in any way the claims of Bombay, Sangli, etc.

(F) In clause (2) of Madras-Mysore Agreement substitute "below" for "above" in the sentence ".....river Bhadra above the existing Bhadra Anicut.....".

Sd/-ALI NAWAZ JUNG Sd/-A.N. KHOSLA 24-12-1945 Sd/- S.M. YOUNUS, 24-12-1945

Sd/- M.Narasimhaiya 27-12-1945
Chief Engineer for Irrigation (Mysore)

Sd/- A.R. Venkatachari 26-12-1945
Chief Engineer for Irrigation (Madras).

Supplement 1 (Page 3) Enclosure (1)

OFFICE OF THE CHIEF ENGINEER (IRRIGATION), MYSORE.

AMP: ERODE,
Dated 27th December 1945.

MY DEAR MR. KHOSLA,

With reference to the Memorandum of Six Clauses jointly signed by Hyderabad, Madras and Mysore Chief Engineers and Technical Adviser, I would like to draw your specific attention to the question of setting up of a Tribunal by the Government of India under CI.E. with a request that you will please have the point examined by the Political as well as the Legal experts in the Government of India to see that it does not conflict in any way with the provisions of the Government of India Act or the Treaty signed by the States.

As my end I will place this matter before the Dewan Saheb and communicate to you by telegram or express letter, his views if any on the matter.

This D.O. should be considered as an enclosure to the Memorandum referred to above.

Yours sincerely,

Sd/- M. NARASIMHAIYA

To

Rai Bahadur A.N. Khosla, I.S.E.,
Consulting Engineer to the Government of India,
W & I,
New Delhi (Camp: Brode).

M.NARASIMHAIYA,
Chief Engineer for Irrigation.

Banglore,
Dated 29th Dec., 1945.

Supplement 1 (Page 4) Enclosure (ii)

Sharing of the Thungabhadra Waters.

MY DEAR MR. KHOSLA,

I submitted the papers to the Dewan and the Minister

for Public Works.

The Dewan sees no personal objection prima facie, to the proposals now made and awaits communication from the Government of India on receipt of which the matter will be dealt with as promptly as possible by the Government of Mysore.

With high regards,

Yours sincerely,

Sd/-

M. NARASIMHAIYA

Supplement II (Page 5)

Regarding the Madras-Hyderabad Agreement the question raised by Mysore in respect of safeguarding her irrigation interest in the Vedavathi basin does not concern Hyderabad and should therefore be settled between Madras and Mysore.

Sd/- ALI NAWAZ JUNG Sd/- A.N.KHOSLA 24-12-1945 Sd/- S.N.YOUNUS, 24-12-1945

Sd/- M.NARASIMHAIYA, 27.12.1945 Sd/- A.R. Venkatachari 26-12-1945

Chief Engineer for Irrigation Mysore

Chief Engineer for Irrigation, Madras.

ENCLOSURE TO SUPPLEMENT I AND II (PAGE 6).

On the memorandum of Hyderabad relating to Vedavati, Madras would agree to the following remark provided mysore agrees too:-

The agreement between Madras and Hyderabad does not effect the rights of Mysore or Madras in regard to the utilisation of the waters of the Vedavati.

On the main memorandum of six paragraphs A to F it is provisionally agreed to add:-

We agree to the memorandum subject to the remark that as regards paragraph F of the memorandum, Madras would agree provided Mysore agrees to let down the water into the river not lower than just below the

Bhadra Anicut.

Sd/- M.NARASIMHAIYA,
Chief Engineer for
Irrigation, Mysore

Sd/- A.R. VENKATACHARI
26-12-1945
Chief Engineer for
Irrigation Madras

Sd/- A.N. KHOSLA,
Consulting Engineer to the
Government of India,
27-12-1945.

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award to the Governments of Mysore and Madras a quantity different from those referred to in Clause 1,6 and 9 above, the two Governments hereby agree to abide by such award.

The Government of Madras agree that the Sivasamudram royalty of Rs.20,000 per annum now agreed to vide Part II of this Agreement shall not in any circumstances be re-opened or revised.

11. Nothing contained in the foregoing clauses shall be deemed to qualify or limit in any manner the operation of the Agreement dated the 18th February 1892 between the Governments of Madras and Mysore in regard to matters other than those to which the Agreement relates.

12. The Government of Madras and the Government of Mysore hereby agree that if at any time there should arise any dispute between them touching the interpretation or operation or carrying out of this Agreement such dispute shall be referred for settlement by two Arbitrators, one to be appointed by each Government, and in case of differences of opinion between the Arbitrators the matter shall be referred to an Umpire appointed by both the Governments.

PART II

RELATING TO THE SIVARAMUDRAM ROYALTY

13. In consideration of Government of Mysore agreeing to the foregoing clause in Part I, the Government of Madras agree, in modification of the terms accepted by the Government of Mysore in their letter No.150-DC, dated the 26th May 1900 regarding the royalty payable by the Government of Mysore for the utilisation of the waters of the Cauvery Falls at Sivasumadram for the

generation of electrical power to accept (in lieu of the payment of Rs.5 per electric horse power per annum for half the total water power utilised) a consolidated sum of Rs.20,000 per annum with effect from the date of the expiry of the previous agreement. Provided always that any water diverted from the river above the falls for the generation of power shall be returned to the river below the falls without being fouled or diminished in quantity as explained in letter No. 4221-302-94, dated 24th August 1900 from the First Assistant to the Hon'ble the Resident to the Dewan and that the other terms and conditions of the previous agreement namely, those contained in sub-paragraphs (iv) and (v) of Paragraph 3 of the Government of Mysore's letter referred to above and herein reproduced below shall continue to remain in full force.

Other terms and conditions referred to :-

(iv) that a cessation on the part of the Durbar to utilise the water of the Falls for the generation of electrical power for two years shall operate to terminate the agreement.

(v) that for the purpose of the power works the Durbar to be vested with the control over the discharge in the river and its branches at and above the falls and to be permitted to build two low dams, subject to the following stipulations:-

a) that the Durbar shall not restrict or interfere with the amount of water for irrigation or other purposes to which amount the Jagirdar of Sivasamudram may be legally entitled; and

b) that the Durbar shall reimburse and make good to the Madras Government all loss of damage which under the decision of a competent civil Court may secure in consequence of the Durbar's operation through the infringment of the legal rights of private persons.

(Sd) G.W. PRIESTLEY,
24-7-1944
Representative,
Government of Madras.

(Sd) N. MADHAVA RAO,
Representative,
Government of Mysore.

from the Bhadra. Nothing in this class shall be deemed to effect the rights of the Government of Mysore to draw off water for factories and towns from the water courses in the Thungabhadra Basin or the rights of the riparian land owners to take water to which they may be entitled under the law.

The Government of Madras note that the Government of Mysore have already prepared a scheme for utilising not more than 11,500 M.C.ft. from an anicut to be constructed across the Thungabhadra near Secrebyle. The Government of Mysore will be at liberty to proceed with this scheme and the quantity of water drawn off at the anicut shall count towards the 15,000 M.C.ft. herein mentioned. In the event of the Government of Mysore not utilising the 11,500 M.C.ft. for the above scheme the Government of Mysore shall be at liberty to utilise the unutilised quantity for schemes in the minor valleys in the Thungabhadra Basin. Such utilised quantities shall include evaporation losses. Full details of every other scheme proposed to be executed by the Government of Mysore for the draw off of the remaining quantity shall be furnished to the Government of Madras and their specific consent obtained before work is started on the scheme. In framing such schemes the interest of all existing irrigation in the respective valleys extending upto the Thungabhadra river shall be fully safeguarded. In the event of the Government of Mysore being unable for any reason to frame such schemes for valleys other than the Bhadra Valley in the Thungabhadra Basin above Mallapuram, or if the Government of Madras should withhold or refuse consent to any such scheme, the

Government of Mysore shall be permitted to draw off from Lakkavalli Reservoir a quantity of water not exceeding 3,500 M.C.ft. (including evaporation losses) out of the unutilised quantity of the said 15,000 M.C.ft. This draw off shall be in addition to the 57,000 M.C.ft. referred to in Clause 1.

7. The means and methods of measuring all inflows, issues, draw off, and the like at any of the works authorised by the Clauses 1 and 2 or by Clause 6 shall be settled by the Chief Engineers of the Governments of Madras and Mysore before such works are started.

8. For the purpose of this Agreement "the year" shall commence on such dates as may be fixed by mutual agreements between the Chief Engineers of the Governments of Madras and Mysore, after working tables for such years as may be agreed upon by the two Chief Engineers have been drawn up and approved by them.

9. After the draw off to which the Government of Mysore is entitled under Clause 1 and 6 after making an allowance of 12,000 M.C.ft. for miscellaneous irrigation above Mallapuram there will be available at Mallapuram an estimated supply of 256,000 M.C.ft. in respect of which the Government of Mysore do not claim any share as against the Government of Madras.

10. The Governments of Mysore and Madras agree that so far as they are concerned, the foregoing clauses shall constitute a final settlement of the rights of the respective Governments in the waters of the Thungabhadra Basin above Mullapuram.

If at any time at the instance of any other party, such as, Hyderabad claiming a right to the waters of the Thungabhadra it becomes necessary to have recourse to arbitration in respect of the sharing of the Thungabhadra waters and if the arbitration tribunal were to

APPENDIX NO. ~~4~~ 2

Agreement between the Representatives of the Governments of Madras and Mysore in regard to the sharing of the Waters of the Thungabhadra.

WHEREAS the Government of Madras propose to construct a reservoir on the Thungabhadra beyond the territory of Mysore:

AND WHEREAS the Government of Mysore also propose to construct a reservoir near Lakkavali on the Bhadra (hereinafter referred to as the Lakkavali Reservoir) a tributary of the Thungabhadra;

AND WHEREAS the Governments of Madras and Mysore consider it necessary and expedient to come to a settlement inter se in regard to the sharing of the waters of the Thungabhadra Basin above Mallapuram.

AND WHEREAS the question of the sharing of the waters of the Thungabhadra Basin between the Governments of Madras and Mysore and the question relating to Sivasamudram-royalty payable by the Government of Mysore to the Government of Madras were discussed by the Representatives of both the Governments at Fort-St. George, Madras on 3rd, 4th, and 5th December, 1936:

AND WHEREAS the Governments of Mysore and Madras have come to a mutual settlement in regard to the sharing of the waters of the Thungabhadra Basin above Mallapuram and in regard to the amount of royalty paid to the Government of Madras in respect of the utilisation of their share of the waters in the Cauvery at Sivasamudram by the Government of Mysore for power purpose:

AND WHEREAS the waters of the Bhadra and Thungabhadra were jointly gauged by the Representatives of the Governments of Madras and Mysore at Lakkavali, Mallapuram and Sunkesala anicut;

AND WHEREAS as a result of the said gauging and discussion the net dependable flow at Mallapuram after meeting the requirements of existing irrigation above Mallapuram, was agreed to as 340,000 M.C.ft.

NOW THESE PRESENTS witness that His Excellency the Governor of Madras and the Government of Mysore do hereby agree and bind themselves, their successors and representatives as follows :-

PART 1

RELATING TO "SHARING OF THE WATERS OF THE THUNGABHADRA".

1. From the total yearly flow of the Bhadra river at Lakkavali, the Government of Mysore shall be entitled to draw off through sluices a quantity of water not exceeding 57,000 M.C.ft. nett for irrigation and power purpose from the Lakkavalli Reservoir. The Reservoir shall be of such capacity as may be agreed upon between the two Governments and as is necessary to enable the Government of Mysore to draw off annually through sluices 57,000 M.C.ft. referred to herein and the additional quantity referred to in Clause 6.

The Government of Mysore shall not be entitled to draw any supply for any purpose at any other point on the Bhadra river save and except the Government of Mysore may draw off water:

a) For supply to factories and towns from the said rivers;

b) at the existing Bhadra anicut for the irrigation of an area not exceeding 20,000 acres inclusive of the area now irrigated from the anicut.

Neither the existing Bhadra anicut nor its scouring sluices nor the headsluices for the right and left bank channels shall be altered in any manner save with the previous consent of the Government of Madras, which consent shall not be unreasonably withheld or refused.

Nothing in this clause shall be deemed to effect the rights of the riparian land owners to take water to which they may be entitled under the law.

2. The Government of Madras agree to the Government of Mysore increasing the capacity of the Lakkavali Reservoir beyond the limit permissible under clause I in order to enable the Government of Mysore to have additional storage, solely for power purposes the supply required for such purposes being drawn off through the sluices; but such additional storage shall be returned without diminution (except diminution by reason of evaporation and percolation) within the same year to the river Bhadra below the existing Bhadra anicut through sluices or in such other manner as may be mutually agreed upon by the Governments of Madras and Mysore and in accordance with the working tables and rules of regulation approved by the Chief Engineers of the two Governments.

3. The Government of Mysore agree to furnish full details of the works proposed to be executed by them in pursuance of Clause 1 and 2 together with the rules of regulation proposed for the new reservoir to the Government of Madras, and obtain their specific consent to such execution and to those rules before starting such works and the said consent shall not be unreasonably withheld or refused.

4. The Government of Mysore also agree to prepare and furnish to the Government of Madras detailed working tables showing how the Government of Mysore propose to give effect to Clauses 1 and 2 and the rules of regulation referred to in Clause 3. Separate working tables shall be prepared to allow:-

a) the capacity of the reservoir required to ensure to the Government of Mysore and the draw off of 57,000 M.C.ft., referred to in clause 1 and the additional quantity referred to in Clause 6;

b) the capacity required in addition to ensure to the Government of Mysore, their power requirements according to Clause 2.

If when working tables are drawn up, it is found that the supplies to existing irrigation as it stood in 1936 below Lakkavalli Reservoir would be adversely effected by the draw off the Irrigation or Power purposes under Clause 1 or Clause 2, the working tables and rules of regulation shall be so revised as to provide for passing such flow, limited to the natural flow, down the river as may be necessary to safeguard the interest of such existing irrigation as well as to ensure the draw off for the Lakkavalli Reservoir as provided in the agreement.

The Chief Engineers of the Government of Mysore and Madras will prepare the working tables after such examination as may be necessary and come to a common speedy settlement in the matter of proportion factors, rules of regulation, monthly limit flows, etc., which will be subject to ratification by the two Governments; and on such ratification such settlement shall be deemed to form part of this Agreement.

5. The Government of Mysore further agree that immediately the draw off from the Lakkavalli Reservoir mentioned in Clause 1 begins, issues from the reservoir shall conform to the working tables mentioned in Clause 4.

6. The Government of Mysore shall also be permitted to draw off for all other new irrigation (including extension to existing irrigation) in the Thungabhadra Basin above Mallapuram besides the water which the Government of Mysore may draw off at the existing Bhadra Anicut (under Clause 1) a total quantity of water not exceeding 15,000 M.C.ft.(evaporation losses being included in this quantity only in the case of tank and reservoir schemes) in the aggregate in the year, provided that such draw off shall not take place

APPENDIX No. 17

Note on Construction Plant Hiremalali Tunnel.

The total length of the tunnel is 13,600 ft.

Four mine shafts are being presently driven at site to provide more headings. From each shaft two headings will be driven, and the operations will be so phased that with a single set of equipment the work can proceed uninterruptedly on both faces. Compressor and blowers will be installed at mine-head and pipe lines run down the shaft to both faces. While at one face drilling and blasting operations will be in hand, mucking equipments such as N.G.Wagons, mine loader and mine head hoists will be working against the other face. After every four hours or so the two operations are switched over, thus providing continuous operation. For efficient working, about 1000' is considered to be the maximum drive of the two headings from either side of the shaft, otherwise it would be increasingly difficult to be able to switch over operations and delays will result.

Although four shafts are being sunk, it would suffice to obtain equipment for working only two mine heads at a time. Air compressor and blower stations will be provided at the end headings and also with the mine headers at the shafts which are being worked.

The plant and equipment necessary for these operations has been figured on the basis of 2 shifts working although there is no reason why the work should not go on round the clock. Similarly 300 working days have been assumed in one year whereas it may be possible to continue the work throughout the year by staggering labour.

Anyway there are the possibilities which can further improve the time schedule but no scaling down of construction plant on these accounts is contemplated.

It is understood that some of the rocks are water--bearing. It is recommended that one drill hole should be carried to about 20-30 feet ahead to tap such water bearing seams and promptly seal them by pumping grout into them under pressure through the drill hole.

The total period of construction has been taken to be 1½ years, 300 days for excavation and 350 for lining, with an over-lap of 200 days. The lining operations are proposed to be started as soon as work from a shaft has been completed. This should be after about 100 days of the beginning of operations. ($\frac{1000'}{10'/day}$ = 100 days).

The total cost of equipment as per this programme works out to about Rs.28.70 lakhs against Rs.39.04 lakhs as provided, basing the costs on existing project figures.

Abstract of costs.

1.	Pneumatic equipment	3,60,000
2.	Hoisting equipment	96,500
3.	Drilling equipment.	4,44,400
4.	Pumps.	2,10,000
5.	Colony W.S.	16,000
6.	Electrical equipment.	6,83,500
7.	Miscellaneous T.& P.	3,28,140
8.	Workshops.	93,500
9.	Telephone equipment.	30,000
		26,03,040
	Add 10% for spares.	2,60,304
		28,63,344
		say 28.63 lakhs.

Items 4(b), 5,8 and 9 have not been reduced although there appears to be some scope for economising in item 5 Electrical equipment.

APPENDIX NO. 18.

LIST OF MACHINERY FOR HIRE MALALI TUNNEL WORKS - BHADRA PROJECT

Appendix No 18

A note on the alternative alignments of the Right Bank Channel - Section II and the Malebennur and Davangere Branch channels.

The alignment of the Right Bank main channel upto its exit from the tunnel and some distance beyond up to the point D has been finally fixed. The two branches, Malebennur and Davangere, take off from the tail reach of the R.B. Channel and command a substantial area.

2. A large tank known as the Sulekere tank (Shanti Sagar) lies in the path of the R.B. Channel. This tank has its own catchment area of 226 sq. miles has an atchkat of 6000 acres and irrigates about 4500 acres. Its gross capacity at F.S.L. (1982.78) is about 3800 m.c.ft. and water spread about 6,000 acres. The tank is formed by the construction of an earth dam across a narrow gorge in the Sulekere Valley and is of an ancient origin. The dam has a very heavy section, being about 100 ft. wide at the top and having nearly 18 ft. free board.

3. The alternative proposals for the alignment of the R.B. Channel and its branches are described below:

(i) The Malebennur Branch Channel on a falling contour along DR_1R_2. The Davangere Branch Channel on a falling contour along DFJVGWH (Southern and Eastern peripheries of the tank).

(ii) The R.B. Channel on a falling contour along DR_1R_2. The Malebennur Branch Channel to start from R2. The Davangere Branch Channel on falling contour along R2 PO (skirting a hill slope), crossing the sulekere Valley below the Sulekere dam along ON by means of an aqueduct or a canal syphon, continuing along the near side of the hill situated on the right flank of the Sulekere dam, crossing the waste weir channel of the tank over an aqueduct and finally joining the alignment in proposal I at H.

(iii) The Right Bank Channel to terminate in the tank as shown by DK in the plan. The Malebenur Branch Channel to take off from the tank along XR1 R2. The Davanagere Branch Channel to take off from the tank along YH.

(iv) The R.B.Channel as in proposal II. The Malebenur Branch Channel as in Proposal II. The Davangere Branch Channel on a falling contour along R1 LM, crossing over the bund in a R,C.C.trough and continuing beyond the bund along the alignment in proposal II. This last alternative is the one recommended by the Team.

4. According to the estimates prepared by the Project Authorities the Proposal I is the costliest. (Rs. 167 lakhs). It has also the following technical disadvantages.

(a) The alignment of the Davangere Branch passes through or very close to a number of villages and to avoid these costly detours will be necessary, thereby further increasing the cost. Alternatively either the villages will have to be shifted or the channel will have to be taken through covered ducts to safeguard the health of the villages.

(b) The Channel cuts across some minor irrigation tanks and will intercept them from their commands. The tanks situated on the downstream side(tank side) will have to be breached to prevent a situation in which these tanks will remain full perpetually, giving rise to unhealthy condition and growth of malaria.

(c) The construction of certain cross drainage works for the channel will present serious difficulties. Some of the drainage valleys are very flat and the flood waters will spread over wide areas and will come up against the u/s Channel bank in long lengths.

(d) Due to seepage from the channel the strip of land between the channel and the Sulekere tank is likely to become water logged permanently, giving rise to problems of rehabilitation. The soils in the area are clayey and

effective drainage will be difficult or at any rate very expensive. The proposal is now looked upon with disfavour by all parties on account of the serious disadvantages. The proposal may not therefore be considered any further.

5. Proposal II, which is estimated to cost Rs. 127 lakhs is free from objections (a) and (b) in para 4, applicable to proposal I. The objection (d) in the case of this proposal is not of much consequence, the area of the strip being very small. The team however considers that the cost of the construction of the length PN of the channel along fairly steep hill slopes is both difficult and underestimated. For crossing the Sulekere Valley below the dam two alternatives have been suggested (i) an aqueduct supported on pile foundations or (ii) a canal syphon. These structures are estimated at 19 and 16 lakhs respectively. The foundation for these structure consists of saturated clayey soils and trial bases up to depths of 40 ft. have failed to show hard stratum. In the design R.C.C. piles, 40 ft. deep have been provided. These might have to be much deeper. The superstructure rises 90 ft. above ground level. The estimated cost (Rs. 19 lakhs) of this 1300 ft. long structure carrying a discharge of 1142 cws. involving costly centerings is on the low side. So also a canal syphon with a head of 90 ft. must cost more than Rs. 16 lakhs. With such high head it would be obligatory to use steel pipes, encased in concrete and the design does not provide for such construction. This major C.D. work may cost as much as Rs. 40 lakhs. This, together with the increased cost of constructing the channel length PN, mentioned earlier, is likely to increase the cost of proposal II by another Rs. 25 lakhs at least, bringing the total cost to Rs. 152 lakhs.

6. Proposal III is estimated to cost Rs. 56 lakhs. As, however, the Branch Channels take off at much lower levels, their further lengths, particularly of the Davangere Branch Channel will involve additional excavation, as compared with

proposal II, where these pass through hill saddles. This additional cost is estimated at Rs. 38 lakhs, bringing the total cost to Rs. 94 lakhs. The objectionable features of this proposal are enumerated below:

(a) The water level in the tank will remain at a high level throughout the year and there will be a dense growth of weeds along the shallow fringe of the lake, favourable to mosquito breeding, giving rise to a serious incidence of malaria. In the Mysore State great importance is attached to the question of health of population and to appreciate the implication of this question it is worth while recalling the fact that 112 old tanks in the command of the Irwin Canal, ex-Krishnarajasagar reservoir had to be breached to check malaria. The condition of the affected villages has been vividly described in official reports. "Tanks in the atchkat areas situated below the channel will be full always due to the collection of seepage water from the channel, as well as from the atchkat above. Incidental to this the water table rises, dampness comes up and marshy areas are formed. All these conditions are so favourable for the breeding of mosquitoes that the area soon gets malarial and the deadly disease overtakes the population resulting in heavy mortality. Aweful stories are told of the sufferings of the people due to the scourage of malaria. Several villages have gone out of existance. In some, it is said there are no male members at all, all of them having succumbed to malaria. It is even said that the young men of some of the villages affected by malaria are denied brides for marriage from other villages. The evil does not confine itself to human beings only, but has spread to cattle also. There is a terrible growth of weeds in the shallow portions of the tank water spread, which gives rise to enormous growth of snail population. The cattle that go to the tank for drinking water, catch a kind of disease called "Lever Fluke Disease", which is due to the snails harbouring in the weeds of the tank .....

The breaching of tanks and other anti-malaria measures have gone a long way in mitigating the evil and restores the people of the tract to their original health and stamina in a large measure". In the face of these facts, based upon previous experience, it is not surprizing that there is a vehement opposition to the proposal of tailing the channel into the Sulekere tank.

It has been argued that by regulating the discharge of the Right Bank Channel the level of water in the tank could be varied at will and thereby the growth of weeds prevented. This proposition is not free from practical difficulties. The main canal has a discharge of 2500 causes and is 58 miles long and the effect of its regulation will take a considerable time to reach the tank. When the tank is full from the discharge from its own catchment there is every possibility of wastage of canal water over the waste-weir. From the tables prepared showing the operation of the channels and the resulting levels in the tank it is seen that the variation in the water levels is of the order of a very gradual variation of 4 feet only, as against a much larger variation which occurs under the present conditions. Any attempt to introduce larger variations by manipulating the discharges of the main canal will affect the generation of power resulting in a direct loss of power and of revenues. (b) The Malebennur and the Davangere Branch Channels taking off from the tank will have their bed levels several feet lower than those in proposal II. This factor not only results in a substantially increased cost of excavation of the channels in proposal III but to gain the same command they have to be excavated in a longer lengths. This must also result in an additional cost, which has yet to be computed.

7. Proposal IV. This proposal has none of the disadvantages of proposal III and the objectionable features of proposal II. This possibility of taking the Davangere Branch over the Sulekere bund has been examined by the Project authorities and an estimate of cost prepared. It had however been considered that it was

undesirable to take the channel over the bund because the bund was old. The Team considers that it is possible to construct a reinforced concrete duct on the bund without affecting the security of the bund or causing any danger to the tank. There should be no risk in taking the channel in a concrete trough over the bund, with copper strip joints to allow for any slight settlement. The load on the foundation is of the order of half a ton per sq. ft. only. The cost of this proposal may be about Rs. 113.5 lakhs. The advantages of this proposal are:

(a) It leaves the Sulekere tank undisturbed;

(b) It is the cheapest practical proposal;

(c) It does not involve any difficult construction such as the aqueduct or syphon across the Sulekere valley which would need at least two years for completion and consequently the date of opening the Branch Channels can be advanced by one full year.

(d) This proposal has found favour with practically all the members of the standing Technical Advisory Committee and the Project Authorities.

N.B. The benefits accruing on account of irrigation on the Davangere and Malebennur Branches being made available earlier by one season have not been computed, but there would be substantial.

Sd/- G.N. Pandit 3-5-57 Sd/- M. Narasimhaiya 3-5-57 Sd/- C.L. Handa. 3-5-57.

APPENDIX NO. 19.

BHADRA (LAKKAVALLI) RESERVOIR PROJECT

Engineering, Agriculture, Health and Economic Survey and recommendations of Zone No. X of Devanagere Branch Channel.

GENERAL

(1) Zone boundaries:-

North:- Mitlakatte - Bevinahalli Valley and Devangere Branch Channel.

East :- Devanagere Branch Channel.

South:- Syagali halla - Naganpr Tank Waste Weir Valley.

West :- Sulekur Nalla

(2) Configuration :-

Sloping from East to West with a general slope of 1 in 270.

(3) Average annual rainfall:- 26.8 inches, distributed between the two monsoons as recorded at Devanagere Rain guage station.

22.9 inches, distributed between the two monsoons as recorded at Harihar Rainguage station.

(4) Villages served in the Zone :- X - Devanagere Branch Channel

No.	District	Taluka	Hobli	Name of village.	Population				House				No. of wells	
					Males	Females	Children	Total	Terraced	Tiled	Thatched	Total	Govt.	Private
1.	Chitaldurg	Harihar	Kasuba	Salaganahalli	93	86	76.73	328	20	2	38	60	1	-
2.	"	"	"	Kadlegondi	65	47	36.33	181	13	7	12	32	1	-
3.	"	Devanagere	Malebennur	Devarabalakere	313	313	200.245	1071	109	87	38	234	3	1
4.	"	Harihar	Kasuba	Bevanhalli	264	253	186.150	862	13	85	11	109	2	1
5.	"	Devanagere	Kasuba	Mudahadadi	188	204	139.157	688	10	90	30	130	4	3
6.	"	Harihar	Kasuba	Salkatte	94	78	36.35	243	8	15	15	38	1	1
7,	"	Devanagere	Hadadi	Vaderahalli	B e c h a r a k.									
8.	"	"	Kasuba	Jarikatte	169	180	130.110	589	-	60	40	100	2	1
9.	"	Harihar	"	Mittalakatte	74	67	68.44	253	-	36	7	43	2	1
10.	"	Devanagere	"	Naganur	180	160	143.107	590	-	70	30	100	2	1
11.	"	"	"	Bisaleri	86	80	48.62	276	-	39	10	49	2	-
12.	"	Harihar	"	Battalakatte	69	73	53.48	243	-	25	14	39	1	-
13.	"	Devanagere	"	Siramagondanahalli	216	192	96.91	595	-	92	20	112	3	-
14.	"	"	"	Avhague	429	407	221.177	1244	-	125	56	181	3	3
15.				Kanagondanhalli	140	137	110.121	508	-	62	12	74	1	-
16.				Bannikode	332	343	261.284	1220	16	100	100	216	3	1
17.				Pamarhalli	98	102	78.59	337	-	40	16	56	2	-
18.				Nitavalli	318	285	168.175	946	-	165	23	188	2	1

Commdnaded area: Gross command --- 13898 acres.
Irrigable extent as per project --- 6000 acres.
Net area selected for irrigation--- 7154 acres.

II. SURVEYS

1. Engineering:-

Distributory starts from 39 mile 6 fur. of the Devanagere Branch channel (continuation)
Length of distributory --- 8 miles 2 furlongs.
Nature of distributory -- Ridge or contour -- partly ridge and partly contour (5 miles 1 fur. 3 miles 1 furl.)
Total fall in the distributory --- 235 feet. (1 in 270)
Number of ridge minors -- 3
Number of contour minors -- 3

Special features :- The zone distributory takes off in S.No.117 of Naganur channel in 7/40 of the proposed Devangere Branch channel. The channel runs in a contour westwards for a length of 2 miles passing to the south of the village Mitlakatte and is continued beyond running on the southern slope of the Salkatte village. Afterwards the channel is run along the ridge for a length of 4 miles and is finally tailed off to Sulekere Halla in Survey No.47 of Salaganahalli village. The ridge alignment of the distributory runs close to the village Bevinahalli to its south and passes very close to the village Salaganahalli to the north of the Gavatana.

A contour minor distributory takes off from mile 2 of the zone distributory to irrigate the portion of the lands of Naganur village and is tailed off to the scour in survey No. 92 of Naganur village, the total length of the distributory being miles 1 and furlongs 4.

To irrigate the lands of Bisaleri Batlakette and Mudahadadi another contour minor distributory is aligned starting from 1st mile 2nd furlong of the zone distributory and running southwards. Minor runs for one furlong in ridge near New Bisaleri village and runs in contour to the west of the Gavatana and is continued in contour for a length of 0 miles 4 fur. and then is aligned as a ridge channel. The ridge alignment passes close to the gavatana of Batlakatte on the western side.

To irrigate the portion of lands of Mudahadadi a ridge minor distributory is drawn from the contour minor in its mile 2 fur. 4 and runs westward, for a length of fur. 5 and is run incontour for a length of furlongs 3 encircling the local mound. The ridge alignment of this distributory runs by the side of the gavatana of Mudahadadi village to the south. The distributory is finally tailed of to the Syagali halla in Survey No. 45 of the village Mudahadadi.

Another minor distributory is drawn from 3 mile 7 furlongs of the zone distributory and runs as a ridge channel for a length of 3½ furlongs and is continued as a contour channel beyond for 1 mile 1 furlong. The ridge alignment of this channel runs just by the side of the gavatana of the village Devira Bilikere on the south. It is tailed off to Sulekere halla in S.No.32 of the above village.

To command the land of Devirabilikere to the north of the village and portions of Kadlagondi, a minor distributory is drawn from the above minor in its mile 0 fur. 3½ and runs as in contour for 4½ furlongs and runs as a ridge channel afterwards finally tailing off to Sulekere halla in Survey No.53 of Kadlagondi village.

Another minor distributory is drawn from 4th mile of the zone distributory to irrigate the portions of lands of Kadlagondi and Devirabilakere and runs as a ridge channel through out and is finally tailed off to Sulekere halla in survey No.29 of the above village. The ridge alignment passes very close to the village Kadlagondi and the north.

The special feature of this zone is the presence of large number of local mounds (high grounds) with many intervening valleys and the major length of the distributory and its minor being run in contour.

Enclosures: Extract from the Revenue Survey maps of villages served in the zone showing the Engineering and health measures, soil disposition and crop planning.

2. Agriculture

(a) Soil classification

(i) Colour and texture

		Extent	
		Acres	Gunthas
Black soils			
Heavy		31	32
Medium		306	27
Light		792	17
	Total:	1130	36
Red soils			
Coarse sandy		5272	19
Fine Sandy		6688	32
Gravelly		805	39
	Total:	12767	10
Other varieties		nil	nil
	Grand Total:	13898	6

(ii) Depth of soil

Below 6"		724	39
6" to 12"		1597	27
12" to 24"		6772	33
24" to 36"		4729	15
Above 36"		73	12
	Total:	13898	6

(iii) Slope

Flat		3222	25
Gentle		10263	9
Steep		412	12
	TOTAL:	13898	6

(iv) Drainage

	Extent	
	Acres	Gunthas
Excessive	630	10
Good	12899	23
Fair	336	21
Poor	31	12
	13898	6

(v) Special features:- The percentage of black soils of all denominations in this zone is roughly only about 8% of the total extent. The total extent of heavy black soil being extremely small namely 31 acres 32 gunthas in Devarabilikere village. The prevailing types of soils are coarse sandy loam and fine sandy loam in almost equal extents. These being well drained and sufficiently deep almost the entire extent not covered by village reserves or mounds is available for irrigation and consequently for the cultivation of a large variety of crops under sugarcane and its rotation and garden crops.

(vi) Enclosures:-

1. Villagewar statement showing the dispositions of soils of different types in the zone.
2. Villagewar statement showing details of crop planned area in the zone.
3. Villagewar statement showing details of excluded area in the zone.

3. Health

(a) Village statistics

No.	Village served in the zone.	Date of Survey.	Physical features.	Survey details: Spleen rate%	Survey details: Parasite rate%	Survey details: Average H.B. rate %	Breeding places.	Water table	Mosquito species: Larvae	Mosquito species: Adult
6.	Devera-belakere	3.3.51	This is a roadside village about 7 miles from Devanagere on the Devanagere-Mallebennur road. The confluence of Sulekere and Syagali halla is situated at a distance of about 3 furlongs on the west of the village. There is a sara running westward at a distance of about 1½ furlongs on the north of the village. A minor distributary has been aligned at a distance of about 2½ furlongs on the south of this village.	7%	0%	77%	Sulekere-nalla running at a distance of about 1½ furlong on the West. 2) Syagali nalla running at a distance of 2 furlong on the South.	33 to 50 feet below the ground level.	Tessellatus. A Stephensi A Subpictus A Culicifacies.	A - Subpictus A - Stephensi.

(b) Special features

1. Siramagondanahalli
2. Naganur
3. Bisaleri
4. Battlakatte
5. Mudahadaddi
6. Devarabelakere
7. Kadlegondi
8. Salaganahalli
9. Bevinahalli
10. Salakatte
11. Jarikatte
12. Mitlakatte
13. Vaderahalli (Becharak)

There are 13 villages situated in this zone of which one Vaderahalli is becharak. Five of these namely Naganur, Battlakatte, Mudahadadi, Jarikatte and Mitlakatte show endemicity with respect of Malaria. The village Jarikatte is highly endemic its spleen rate being 37%

(c) Enclosures

1. Statement showing the details of spleen, parasite and Hemoglobin survey of
2. Statement showing the details of Anopheline adult collections by type of dwelling and species.
3. Statement showing the details of Anopheline larval collections by type of breeding places and species.
4. Statement showing the total No. of births and deaths and deaths due to fever in the villages.

Classification of Lands (village war)

Sl. No.	Name of village	Government lands.			Inam Lands			Total			Gomal Kharab		Assessed waste lands			Total for the village.
		Dry	Wet	Garden	Dry	Wet	Garden	Dry	Wet	Garden			Dry	Wet	Garden	
1	2.	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Devarabelikere	1312-26	-	3-1	225-34	-	-	1538-20	-	3-1	34-35	80-21	-	-	-	1656-37

Proposed for irrigation.

Sugarcane and its rotation.	Permanent paddy	Semi-dry	Permanent garden	Total
18	19	20	21	22
713-23	149-38	-	177-20	1040-1

6. Education.

	Boys	Girls	Dovarabolikere
No. of primary schools	7	-	1
No. of middle schools	1	-	1
No. of high schools	-	-	-

7. Industries

	No.	Remarks
Spinning spindles		
Seaving Looms		
Mat weaving - families engaged		
Carpentry -do-	6	2 families
Smithy -do-	5	3 families
Other industries -do- pottery	3	-

8. Medical Health Veterinary

Disponsaries	-	-	-
Health Units	-	-	-
Veterinary disponsaries.	-	-	-

9. Banks & Societies

Banks	-	-	-
Societies	-		-

10. Communications:- There is a district Board Road from Devanagere to Mallebennur passing through Mitlakatte, Jarikatte and Devarabelikere. This is still under formation.

11. Special features:-

There is much indebtedness in the zone, due to continuous bad seasons. The average gross income per capita is as follows:-

1	Siramagondanahalli	Rs. 86½
2	Naganur	Rs. 86
3	Bisaleri	Rs. 104
4	Battalakatte	Rs. 102
5	Mittalakatte	Rs. 140
6	Jarikatte	Rs. 55
7	Salakatte	Rs. 98
8	Mudahadadi	Rs. 84
9	Kadlegondi	Rs. 230
10	Devarabelikere	Rs. 65
11	Bevanahalli	Rs. 44
12	Salaganahalli	Rs. 100

12. Enclosures

1. Statement showing the details of houses and population in the villages of the zone.
2. Statement showing the number of khatedars and the No. of khatedars indebted in the villages of the zone.
3. Statement showing the economic conditions of the depressed classes in the villages of the zone.

III. RECOMMENDATIONS :-

1. Engineering :-

The zone distributory is aligned on the southern slope of the local mound to the south of the village Mitlakatte to avoid seepages to the village. Similarly, to avoid seepages to the village Salakatte the alignment of the distributory runs on the southern slope of the local mound to the south of the village. To allow sufficient dry zone to the village Bevinahalli, the distributory is run on the southern slope of the ridge beyond two furlongs from the "Gavatana". The zone distributory is aligned on the northern slope of the ridge beyond two furlongs from the gavatana of Salaganahalli to allow sufficient dry zone to the village.

The ridge minor distributory is aligned on the western slope of the ridge near the village Battlakatte to allow sufficient dry zone to the village. Similarly in case of Madahadadi Devirabilakere and Kadlagondi, the ridge minors are taken on the other sides of the slopes beyond two furlongs, to allow sufficient dry zones to the village.

The main Devanagere Branch channel is continued upto 37 miles 2 furlongs is proposed to be deviated from mile ; , Since the alignment will have to pass through the dry zone for Devanagere City. The altered alignment of the main channel runs to the north of the village Siramagondanahalli and is al

2. Agriculture

	Extent Acres	Extent gunthas
(a) Area included for irrigation	7153	29
(b) Area excluded due to:		
1. Village Reserve	4538	7
2. Heavy Black soil	10	0
3. High mounds	2030	2
4. Shallow, stony and waste lands	166	8
5. Alkaline patches.	Nil	Nil.
Total:	6744	17
(c) Crop planning:-		
1. Sugarcane and its rotation crops	4749	19
2. Permanent Garden lands	1970	28
3. Semi dry crop area	144	28
4. Permanent paddy lands	288	34
5. Forest plantations	Nil	Nil
Total:	7153	29

(d) Other recommendations

1. As in other zones the sides of valleys and major scours are proposed to be lined by hongey plants to arrest erosion on the sides and provide green leaf manure for paddy crops.

2. The zone provides for nearly 2000 acre of garden land which is well distributed in the villages of the zone which are benefitted by the project. Most of these lie by the sides of the valleys and are suitable for coconut, plantain, betel wine, areca and mangoes.

3. The interval of irrigation in this zone is recommended to be once in eight days.

3. Health

a) Name of village:	Devarabelakere
b) Village reserve boundaries:-	A dry belt of about 2 furlongs around the village will have to be left and demarcated by the following boundaries:-
North	The sara on the north passing through S.Nos. 122,131, 77,74,75,73,69,70,68, 66,64,38,and 39 and a minor between this sara and the mound on the East in S.Nos. 120 to 122.
East	The mound on the east.
South	The minor distributory.
West	Sulekerehalla.
c) Village extension proposed:-	An extent of 6 acres is selected in S.Nos. 1 & 2 adjacent to the village on the East for the extension of this village.
d) Manure Pits:-	Two plots of 1¼ acre each are selected in S.Nos. 74 & 33 adjacent to the village for laying out manure pits.
e) Engineering Works:-	
1. Tanks:	Nil
2. Channels:-	The minor distributory has to be taken beyond two furlongs on the South.
3. Valleys:-	The sara on the North and Sulekerehalla will have to be graded and canalised.
f) Health Unit Recommended:-	This is included in the Health Unit to be located at Hadadi.
g) General:	Nil.

Health Survey Table No. 3

Statement showing the details of Anopheline larval collections by type of breeding places and species in the villages of Zone No. 10 of Devanagere branch Channel.

Sl. No.	Name of Village.	Date of Survey.	Type of breeding	A subpictus 3rd instal	A subpictus 4th instal	A cubicifacies 3	A cubicifacies 4	A. vagus 3.	A. vagus 4.	A. Tessellat 3	A. Tessellat 4	A. Stephensi. 3	A. Stephensi. 4	A Borainsis. 3	A Borainsis. 4
6.	Devarabelakere	3-3-51	1. Sulekere halla running at a distance of about 1½ furlongs on the South.	-	-	-	2	-	-	-	3	-	4	-	-
			2. Syagalihalla running at a distance of about 2 furlongs on the South.	-	3	-	3	-	-	-	-	-	-	-	-

Sl. No.	Name of the village	Black soils				Total		Red soils						Total		Grand Total		Depth of soils					
		Heavy		Medium		Light		Coarse Sandy		Fine sandy		Stony & gravelly						0" - 6"		6" - 12"		12" - 24"	
		A	G	A	G	A	G	A	G	A	G	A	G	A	G	A	G	A	G	A	G	A	G
1	2	3		4		5		6		7		8		9		10		11		12		13		14	
5.	Devarabel-akere	31-32		144.17		251.0		427-9		636-14		515-12		21-36		1173-22		1600-31		21-36		182-17		793-14	
	S.Nos.	109, 110		106;107 114-125, 129-136		17;19-33 38-40, 42,44, 46,62, 68,95, 96,102, 114-125 127,128 131				2,11-18 20-27, 29-34, 39;57, 59-68, 70-72, 75-94, 97,98, 103,108, 109,111, 122,126, 131		1-6, 8-11, 13,15, 16;28-33 35-37, 39-59, 62-64, 66,68, 73,74, 77;96, 99-102, 104,105 114-127		7,93 69,						7.93		1,78-82 87,89-94 113-122, 1311		2-6,8-18; 20-27;32-34, 39;56-68; 70-72,75-77, 83-86,88, 95-104,107-109;111,112, 114-122,126, 128,131.	

AGRICULTURAL SURVE Y ZONE X (Devangere Branch Channel) ENCLOSURE 1

-22-

Villagewar statement showing details of soil classification of the lands in this zone.

Sl. No.	Name of the village.	24" - 36" A	24" - 36" G	Above 36" A	Above 36" G	Total A	Total G	Flat A	Flat G	Gentle A	Gentle G	Steep A	Steep G	Total A	Total G	Drainage of soil: Excessive A	Excessive G	Good A	Good G	Fair A	Fair G	Poor A	Poor G	Total A	Total G
		15		16		17		18		19		20		21		22		23		24		25		26	
		571-25		31-19		1600-31		480-22		1120-9	-	1600-31		12-3		1401-1		155-35		31-32		1600-31	
		13,15,16 19-33, 35-55,42 64,66,69, 73,74,77, 105,106, 114,127, 129-130		109-110				1-4, 5-7,9, 8-11,11-27,30 13,15, 34,37-42, 28,29, 44,46,49, 31-33, 52,54,55, 35,36, 57,59-72, 43,45,47, 75-94,97- 48,50,51, 119,123,126, 53,56,58, 129,131 73,74,77, 95,96, 115-125, 127,128, 130,131								93,		1-37, 39-105, 108,109, 111-128, 131		38-62, 63,106 107,114 -125, 129,130.		109-110	

SURVEY TABLE II

Statement showing the number of khatedars and the number of khatedars indebted in the villages of X zone of Devanagere Branch Channel.

Sl. No.	Name of village	No. of Khatedars	No. of Khatedars indebted	Percentage of indebtedness.	REMARKS
1.	Siramagandanahalli	117	80		
2.	Battalakatte	39	23		
3.	Bisaleri	86	5		
4.	Naganur	131	60	54%	
5.	Mittalakatte	60	23		
6.	Jarikatte	85	65		
7.	Vaderahalli	Becharak			
8.	Salkatte	103	60		
9.	Mudahadadi	140	30		
10.	Bevanhalli	65	40		
11.	Devarabelakere	133	100		
12.	Kadlegondi	75	50		
13.	Salaganahalli.	80	60		
	Total:	1114	596		

Sd/- Assistant Commissioner.

ECONOMIC SURVEY TABLE NO. III.

Statement showing the economic conditions at the depressed class people in the villages of X zone, Devanagere Branch Channel.

Sl. No.	Name of village	Population					Terraced	Tiled	Thatched	Total	Families			Occupation		
		A.K.	A.D.	Banajiga	Vaddar	Total					No. of families.	No. having lands.	No. Indebted.	Agriculture	Coolly	Trade or other profession.
1.	Sirmagondanahalli	66				66			22	22	22	12	12	48	18	
2.	Battlakatte															
3.	Bissaleri	23				23			5	5	5	5	5	23		
4.	Nagannur	106				106			20	20	20	6	6	26	80	
5.	Mittalakatte	78				78		7	6	13	13	10	10	60	18	
6.	Jarikatte	32				32			8	8	8	2	2	8	24	
7.	Vaderahalli			Becharak												
8.	Salkatte	8			48	56			10	10	10	2	2	10	46	
9.	Mudahadadi	60				60		1	9	10	10	10	10	60		
10.	Bevanahalli	36				36			6	6	6	6	6	36		
11.	Devarabelakere	125				125			30	30	30	2	2	15	110	
12.	Kadlegondi	8				8			2	2	2	-			8	
13.	Salaganahalli	6			51	57			9	9	9	6	6	30	27	
	Total:	548			99	647		8	127	135	135	61	61	316	331	

Sd/- Assistant Commissioner.

| No. | | |

MYSORE P.W.D.

Bhadra Reservoir Project Dn.

Statement of the survey Nos. and the extent commanded by the Devanagere Branch Channel under the Bhadra Reservoir Scheme showing the details in regard to soil colours, deteriorating factors, existing classifications & other particulars.

Sr. No.	Name of village.	Survey No. below the channel trace	Extent of Survey No. Exclusive of phoot Kharab.	Soil colours as noted in Prathi & Pakka Books (R) Red	(B) Black	(W) White	Deteriorating factors as per Prathi Book (K) Kharab	(S) Salt	(Sg) Sloping ground.	Existing classification of lands: Channel or tank fed wet	Garden	Forest.	Gomal Hullu-banni or Govt. cattle reserve & tank bed.	Dry lands in holding including Rainfed wet.	Soil values as noted in classification Regrs. A: 10 annas & above	B: 8 annas to 9 annas 11 pies	C: From 5½ annas upto 8 annas	D: Below 5½ annas	Unclassified.	Area selected for irrigation. (col. 16+17+18+19+20) (Irrigation area commanded.	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
6	Devarabelikere	1	1-10	R			No	DF's													
		2	21-1	"				S	Sg					1-10				1-10		1-10	
		3	22-0	"	B			"	"					21-1			27-1			27-1	
		4	25-27	"				"	"					22-0		22-0				22-0	
		5	5-0	"				"	"					25-27			25-27			25-27	
		6	8-0	"				"	"					5-0				5-0		5-0	
		7	9-33	"				"	"					8-0				8-0		8-0	
		8	7-5	"				"	"					9-33				9-33		9-33	
		9	11-16	"				"	"					7-5				7-5		7-5	
		10	8-1	"	B			"	"					11-16				11-16		11-16	
		11	13-24	"				"	"					8-1				8-1		8-1	
		12	34-35	"				"	"					13-24				13-24		13-24	
		13	12-29	"				"	"											34-35	Govt. land
		14	4-8	"			K	-	"		W.F 0-39		34-35								
		15	6-25	"				"	"					11-30		0-39		11-30	34-35	12-29	Khrab
		16	19-25	"				"	"					4-8				4-8		4-8	
		17	19-1	"	B			"	"					6-25				6-25		6-25	
		18	21-32				K	"	"					19=25			19-25			19-25	
		19	19-24		B			"	"					19-1			19-1			19-1	
		20	15-15		"		K	"	"					21-32			21-32			21-32	
		21	18-22		"		"	"	"					19-24	19=24					19=24	
		22	24-8				"	"	"					15-15			15-15			15-15	
		23	13-10		B			"	"					18-22			18-22			18-22	
		24	6-30		"		K	"	"					24-8			24-8			24-8	
		25	10-13		"		"	"	"					13-10			13-10			13-10	
		26	22-19		"			"	"					6-30			6-30				

| | | |

Contd.

3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
63	5-34	R	B		K	S	Sg					5- 34		5-34				5-34	
64	11-13	"			"	"	"					11-13			11-13			11-13	
65	10- 6	"				No.DF's						10- 6				10- 6		10- 6	
66	21-10	"				S	Sg					21-10				21-10		21-10	
67	3- 8	"				"	"					3- 8				3- 8		3- 8	
68	8-8	"				"	"					8- 8			8- 8			8- 8	
69	6-38	"				"	"					6-38			6-38			6-38	
70	15-23	"				"	"					15-23				15-23		15-23	
71	5-34	"				"	"					5- 34				5-34		5-34	
72	4-26	"				"	"					4-26				4-26		4-26	
73	6-15	"				"	"					6-15			6-15			6-15	
74	12- 0	"	B.			"	"					12- 0		12-0				12- 0	
75	6-28	"				"	"					6-28				6-28		6-28	
76	3-13	"				"	"					3-13				3-13		3-13	
77	18-28	"	B			"	"					18-28			18-28			18-28	
78	9-34	"				"	"					9-34				9-34		9-34	
79	8-14	"	B			"	"					8-14				8-14		8-14	
80	11- 0	"				"	"					11- 0				11- 0		11- 0	
81	9- 1	"				"	"					9- 1				9-1		9- 1	
82	4- 6	"				"	"					4- 6				4- 6		4- 6	
83	7-19	"				"	"					7-19				7-19		7-19	
84	2-19	"				"	"					2-19				2-19		2-19	
85	4-20	"				"	"					4-20				4-20		4-20	
86	4-22	"				"	"					4-22				4-22		4-22	
87	21-17	"				"	"					21-17				21-17		21-17	
88	3- 6	"	B			"	"					3- 6				3- 6		3- 6	
89	15- 1	"	B			"	"					15- 1				15- 1		15- 1	
90	8-23	"				"	"					8-23				8-23		8-23	
91	7-32	"				"	"					7-32			7-32			7-32	
92	12-37	"					"					12-37			12-37			12-37	
93	22-24	"					"					22-24				22-24		22-24	
94	18-28	"					"					18-28				18-28		18-28	
95	3- 5	"				S	"					3- 5				3- 5		3- 5	
96	11-2	"				"	"					11- 2				11- 2		11- 2	
97	26-36	"					"					26-36				26-36		26-36	
98	19-12	"					"					19-12				19-12		19-12	
99	12- 7	"				S	"					12- 7				12- 7		12- 7	
100	27- 0	"				"	"					27- 0			27-0			27-0	
101	13-21	"				"	"					13-21				13-21		13-21	
102	15- 9	"			K		"					15- 9				15- 9		15- 9	
103	18-27	"	B			"	"					18-27		18-27				18-27	
104	16-31	"	"		K	"	"					16-31			16-31			16-31	
105	12-24	"				"	"												

APPENDIX NO. ~~20~~ 10

R E P O R T

on the

LHADRA RESERVOIR DEVELOPMENT COMMITTEE

IV. RECOMMENDATIONS

(a) Engineering

(i) Opening of roads in the atchkat area. - The system of roads in the atchkat area has been got up in consultation with the concerned Deputy Commissioners, the District Board Presidents and the Sub-Committee Officers. The total length of class "A" roads recommended is 159 miles, class " B " roads is 235 miles, and class " C " roads is 311 miles and the approximate cost is Rs. 1,01,00,000.

The net work of roads now approved by the Committee is proposed to be formed prior to the irrigation development of the area.

(ii) Water distribution system - Opening of hikkals by acquisition of lands and their maintenance. - The Chief Engineer was of the opinion that the system of irrigation based on the nature of soils, as already approved by the Bhadra Reservoir Development Committee was preferable only with a slight readjustment of blocks depending on the nature of the configuration and that the same would be finalised later on, when the water is let into the channel. This was agreed to by the Committee.

Hikkals are proposed to be opened out and maintained by Public Works Department as in the case of distributaries and main channel, the cost being recovered from the concerned raiyat. The exact positions of the hikkals are to be marked on the Revenue Survey map.

(iii) Survey of pick-up channels. - Pick-up weirs are to be constructed across the valleys at suitable intervals to use the waste water between the pick-ups to realise higher duties.

(iv) Watering to be allowed during scanty years of rainfall for lands in the dry belt area.- A few waterings from the channels may be given to dry belt areas of villages, during years of scanty rainfall, to prevent the failure of crops for want of rain at the required time.

(v) Watering to be allowed for excluding areas in special circumstances.- Heavy black soils are recommended to be included under the atchkat and semi-dry or irrigated dry crops are recommended to be grown in heavy black soils.

(vi) Printing of Zone reports and Maps.- The zone reports and maps which are the most important and valuable records will be very useful for preparing the future projects and are therefore to be printed and copies made available for the Engineering, Agricultural, Health and Revenue Department. The fair copies of zone maps have to be prepared immediately as per approved colour scheme in the standard size of 6' x 4' for facilita -ting of printing of maps at a future date.

(b) Agriculture.

(i) Crop planning and other recommendations.- The total area recommended for crop planning on the basis of soil classification is 2,24,200 acres out of the total gross commanded area of 3,77,164 acres. The area selected for (1) sugar cane and its rotation crop is 62%. (2) Permanent gardens is 23%, (3) permanent paddy lands is 7½% and (4) semi-dry crops is 7½% of the total selected area.

The areas recommended for exclusion from irrigation are (1) village dry belts 54.1%, (2) Alkaline patches:- negligible, (3) shallow, stoney and waste lands 1.9%, (4) high mounds 32.3%, (5) inaccessible patches of irrigable soils (10.5% of the total excluded area) due either because the distributary has to be aligned very close to a village, or because the distributary has to be taken for very long lengths in heavy black soils to feed a few hundred acres beyond it: tank beds 1.2%.

Grazing reserves of villages are not excluded from irrigation unless they are excluded for one or the other of the above mentioned reasons.

A statement showing the areas selected for irrigation and excluded area, etc., is note over leaf :-

Sl. No.	Name of channel	Area excluded							Grand total
		Village reserve	High mounds	Shallow stony waste lands	Alkaline patches	Soils other than black	Tank bed	Total excluded area	
		10	11	12	13	14	15	16	17
1.	Left Bank Channel	3,448	6,512	36	8	--	530	10,534	28,428
2.	Right Bank Channel	11,043	7,654	145	--	511	1,091	20,444	59,995
3.	Anvery Distributary	3,758	2,376	116	--	--	119	6,369	17,516
4.	Malebennur Branch channel.	13,840	1,853	323	163	5,821	--	21,980	86,242
5.	Davanagere Branch Channel.	46,163	28,436	1,838	--	8,856	--	85,293	1,84,983
	Total	78,252	46,811	2,458	171	15,188	1,740	1,44,620	3,77,164

MODIFIED STATEMENT OF AREA SELECTED FOR IRRIGATION, EXCLUDED AREA AND GROSS COMMAND AS APPROVED BY THE B.R.D. COMMITTEE.

(All areas in acres)

Sl. No.	Name of channel	Area selected for irrigation						Total area selected for irrigation.
		Sugarcane and its rotation.	Permanent garden	Semidry	Permanent paddy.	Heavy black selected	Tank atchkat	
1	2	3	4	5	6	7	8	9
1.	Left Bank Channel.	8,272	2,811	573	912	--	5,326	17,894
2.	Right Bank Channel.	20,126	7,549	1,262	2,470	--	8,144	39,551
3.	Anvery Distributary.	8,173	2,687	--	98	--	189	11,147
4.	Malebennur Branch Channel.	31,106	9,760	6,955	5,006	7,257 out of 11,435	--	60,084 out of 64,262
5.	Davangere Branch Channel	53,080	21,933	6,483	6,771	7,257 out of 11423	--	95,524 out of 99,690
	Total	1,20,757	44,740	15,273	15,257	14,514 out of 22,858	13,659	2,24,200 out of 2,32,544

(ii) Demonstration forms are to be started as recommended. - Experimental farm near Tyavanige is recommended to be started immediately to decide the system of crop planning on the heavy black soils.

A few demonstration farms are recommended to be opened in the area for educating the raiyats regarding the improved methods of Agriculture.

(iii) Special Labour and Agricultural Colonies may be formed.-The total population in the area is 2,54,648 Gross command in the area is 3,77,164 acres which includes the area selected for irrigation of 2,24,200 acres which works out to an average of about 1½ acres per head, or about 7½ acres per family of one male, one female and three children. Due to the huge extent of lands coming under irrigation it is recommended to have Agricultural Colonies where there are not enough of population for irrigating the full area.

(iv) Development of Agricultural Practice.-The use of mechanical appliances is a device to economise an agricultural labour and bullock strength. The raiyats have to be made machine minded. Using of tractors for preparatory cultivation of lands, using Harvesters wherever possible for harvest of grain crops and a free use of lorries for conveying produce and manures is recommended. It is recommended to step up the agricultural produce by using the high yielding superior strains of seeds available at the Agricultural Depots. It is recommended to grow the crops as per soil survey recommendations to have the maximum income from lands.

(C) Health

(i) Shifting of villages proposed to be started even before opening out of channels.-The number of v illages

recommended for shifting is 99. The cost of shifting these 99 villages is Rs. 17,94,010 which work out to an average of Rs. 18,121 per village shifting. The villages are proposed to be shifted to their new selected sites before the opening out of channels. The average cost of shifting the villages on left bank and right bank (Malnad) is Rs.9,740 and the average cost of shifting the villages of Anvery, Malebennur and Davangere area (Maidan) is Rs. 29,012.

(ii) Extensions of villages proposed.-In the atchkat area there are many villages which are not recommended for shifting. The exact positions are recommended for extending the existing villages keeping in view the probable increase of the population due to the higher birth rate and also for accommodating the extra labour which may be required after the advent of the canal.

(iii) Formation of Health Units as proposed to be commenced in advance of execution of works.-Fifteen Health Units are recommended to be formed in the atchkat area, in addition to the existing Health Units. These Health Units recommended are to be formed before the irrigation commences.

(iv) Special treatment for channels, tanks, kattes and valleys proposed.-The portions of channels coming within the dry belt area of the villages are recommended to be suitably canalised.

Small tanks are recommended to be breached, while big tanks are recommended to be retained with deep scouring sluices at the centre of the bund. The tanks,

big, or small, in the dry belt area are not recommended for breaching as the breaching of such tanks involves heavy expenditure to be incurred in the form of compensation for converting wet lands into dry. Kattes are generally recommended to be breached. Valleys are recommended to be graded in their entire lengths.

The Committee is of the view that the decisions arrived at, at the 31st meeting were applicable to all zone reports regarding the breaching of tanks and grading and canalisation of valleys and that this decision supersedes all the previous devisions on the above two subjects.

(d) Economic.

(i) Prevention of speculation in land.-this subject being very important has been discussed in detail in six meetings and the discussion has extended for over a period of 2½ years. The Madras Government has been addressed to send copies of the speculation Act of Tungabhadra Project area. Pending final opinion on the subject, it is decided to pass an enactment in Mysore also similar to the one passed by the Madras Government to prevent the possible speculations in lands that may be submerged as well as in lands that maycome under the atchkat.

(ii) Disposal of Government lands, likely to become irrigable under the Bhadra Reservoir Project.- This is an important subject which has been discussed in nine Bhadra Reservoir Development Committee meetings and has extended for over a period of nearly two years.

The Committee agreed that the Government waste and forest lands irrigable in the first four zones of the Right Bank Channel and the lands in the first five miles of the Left Bank Channel, may be reserved for the grant of lands to the expropriated raiyats. The Chairman was of the view that in all cases the disposal of lands should be only by public auction as it would be unfair to fix any rate now with the prospect of getting water to those areas some time later. Disposal on upset price and under other concessional rates would also complicate matters later.

(iii) Land Mortgage Banks.-It is seen that the percentage of indebtedness is 37 in this area. After the advent of the canal raiyats require great finance for converting the dry lands, forest lands and gomals to wet lands, for purchasing the latest Agricultural implements and for paying the wages for the labourers and for purchasing manure, etc. The Land Mortgage Banks must be increased so that the villagers can take advantage of the land Mortgage Banks for taking loans on low rate of interest instead of the present system of taking loans from the local money lenders at a very high rate of interest.

(iv) Development of Industries.-There are at present small cottage industries in almost all the villages. After the advent of the canal and power generation sugar factories and spinning centres with power looms are recommended.

(v) Increase in water rate and contribution consistent with the increase in cost of the project.-The contribution and the water rate are Rs. 60 and Rs.7-8-0 per

acre respectively in the original estimate (Rs. 888 lakhs) which would give a return of 4.12 %. As it was resolved to levy differential water rate as recommended by the Chief Engineer and that the Engineering Department should raise the demand for water rate every year and send it to the Revenue Department for collection.

The Committee felt that the Irrigation Act should be further amended to empower Irrigation Officers to take strict action for the economical use of water for irrigation to realise higher duties of water. In view of the higher cost of the materials, labour and machinery the cost of estimate will be very high. It is therefore recommended to adopt the contribution amount and water rates as follows:-

WATER RATES

Sl. No.	Kinds of crops	Unit	Per Acre RS.
1.	Semi-dry crops in heavy black soil.	1 (Basic)	2
2.	Semi-dry in other soils	2	4
3.	Gardens, such as cocoanut, fruit trees like Mango, Sapota, etc.	3	6
4.	Gardens like Areca, Bananas, Betel leaves, potato and vegetables.	5	10
5.	Permanent paddy	6	12
6.	Sugarcane	12	24

For existing tank atchkats it was resolved to levy an extra water rate to bring it to the level of the water rate now recommended.

CONTRIBUTION AMOUNT

1. New Atchkat.

Sl. No.	Kinds of crops	Unit	Rate per acre RS.
1.	Permanent semi-dry	1 (Basic)	100
2.	Permanent paddy, sugarcane and its rotation or permanent garden.	$2\frac{1}{2}$	250

II. Old Atchkat.

Sl. No.	Kinds of crops	Unit	Rate Per Acre RS.
1.	Existing garden and tank atchkats.	1	100

III. New Atchkets by Lift Irrigation.

It was resolved to omit this type of irrigation from the atchkat, as its inclusion would lead to complications in fixing the contribution and water rates, etc.

(vi) Education Facilities.-There are 266 primary and 39 Middle schools in the village parts. As it is found to be insufficient 60 Primary Schools, 6 Middle Schools and 3 High Schools are recommended to be opened. Generally it is proposed to have one primary school for each village. Suitable buildings for schools are recommended for schools which are being conducted in temples, village panchayat halls, etc.

(vii) Live-Stock.-The total number of live-stock in this area is 170,455. There are 133 breeding bulls and 41,706 bullocks for a gross commanded area of 377,164 acres, which works out to an average of 18.1 acres of land

(m) Programme of water supply in the channel to be fixed and intimated to the ryots beforehand.

(n) The raiyat may be allowed to grow any crop he wishes subject to the approved programme of water supply and approved crop planning.

(o) All the heavy black areas are to be included in the atchkat under semi-dry cropped area.

(p) Watering is to be supplied from the channel during the periods of scanty rainfall to the lands in the dry belts or village reserves.

2. Agriculture.-(a) High mounds and lands lying above the irrigation margin, shallow, stony and waste lands, and alkaline patches not proposed for irrigation, are recommended to be excluded from the atchkat. Areas of heavy black soils under the atchkat are recommended to be included in the atchkat.

(b) Red coarse sandy loams and fine sandy loams and light black soils 12 inches and more in depth which are well drained, and are on a flat plain or on gentle slopes are recommended for sugarcane and its rotation crops.

(c) Fine sandy loams which are 12 inches and more in depth and which are well drained and are on a flat plain or gentle slope, and deep lying light black soils are recommended for garden lands.

(d) Permanent paddy crops are recommended in soils which are at the foot of slopes where there is a tendency for lands to become marshy on account of seepage from the upper regions.

(e) Medium black soils are as a rule recommended for semi-dry crop cultivation.

(f) Alkaline lands-Effective drainage and also raising of casuarina plantations are recommended for the area

(g) A belt of 50 feet to 100 feet is proposed to be left on either side of the rivers and hallas, where "Honge" grove, Tamarind, Mango, Jack and Myrabalams or grass may be grown.

(h) Deeply eroded area at the lower end of slopes may be used to plant Cashew-Nuts, Tamarind, Honge, Agase (Sisal), etc.

(i) High yielding superior strains of Togari are recommedned to be introduced chiefly in the red soils of Channagiri and Honnali Taluks.

(j) The cultivation of high yielding strains of Bengal gram is to be encouraged in medium black soils, under "Voddu" or saguvali kattes and as an after crop in paddy lands on the residual moisture.

(k) Special varities of dry land Ragi are recommended for deep and fertile and soils,

(l) High yielding dry paddies are recommended for the rainfed crop areas.

(m) Cocoanut cultivation is to be encouraged in the areas recommended for garden cultivation.

(n) Soyabeau is recommended under rotation and semi-dry crops.

(o) Potatoes are to be grown in garden lands. Sweet potatoes can be grown as an after crop after paddy. Tapioca can be grown on the margins of plots in garden lands.

(p) Fodder grasses like Guinea, Rhodes and Napier may be grown in semi-dry crop area and in the belt of land proposed to be left on the margins of rivers and hallas.

(q) Medicinal plants like senna and pyrethrum can be grown in rotation with sugarcane.

(r) Cultivation of peas is recommended as a field crop in rotation area and semi-dry crop area.

(s) Fruit cultivation may be encouraged in small extents chiefly in the lands lying between Bhadravathi and Honnali.

(t) High yielding superior varieties of plantains may be largely encouraged in the irrigated garden lands in malnad area.

(u) Under perennial irrigation, high yielding finer varieties of paddy are recommended to be introduced.

3. Health.-(a) A dry belt of about 2 furlongs from the peripherry of each village or at the new site is recommended except for villages situated on the upper side of the channel.

(b) Shifting of the villages wherever necessary is to be taken up depending upon their situation and other factors.

(c) Filling up of the burrow pits, manure pits and pools lying in the dry belt is to be done.

(d) Extensions for all villages are to be formed.

(e) Manure pits for all villages are to be opened.

(f) All valleys with their tributaries to be graded and canalised in their entire lengths.

(g) Tanks and kattes are to be breached or to be retained with deep central sluices.

(h) All channels within the village dry belts are to be cement-concrete lined.

(i) Health units are to be provided at suitable places to serve each group of villages.

(j) Sites are to be formed for the Agricultural colonies.

4. Economic.-(a) The labour deficiency has to be made good by encouraging landless families to come and settle in the area, by granting them one or two acres of gomal or government kharab lands as an inducement.

(b) The deficiency in bullock has to be made good by importing bullocks from outside and by improving the efficiency of the local breed.

(c) One breeding bull is to be provided for every panchayat, if not, for every village.

(d) Sufficient protective measures have to be taken for the cattle in the area against liver fluke disease.

(e) The use of mechanical appliances such as tractors, harvesters and lorries to economise the agricul-tural labour and bullock strength, is to be resorted to.

(f) Land Mortgage Banks are to be opened to finance the indebted raiyats to relieve the present indebtedness.

(g) The further fragmentation of holdings is to be prevented by an Act of consolidation and prevention of holdings below a minimum size legally fixed. This could be done by voluntary and mutual exchange of plots and their consolidation into suitable economic holdings.

(h) Small cottage industries like weaving, mat-making, pottery are on a decline in the villages. New designs have to be introduced quickly and their extensive adoption may be arranged by the Department of Industries and Commerce.

(i) One sugar factory is proposed at Harihar and another at Bhadravathi or Shimoga where water, power and Railway facilities are available.

(j) The number of Primary, Middle and High Schools are to be increased at suitable places.

(k) The Veterinary Dispensaries are few in number and are to be increased at places recommended.

(l) The existing village roads are to be improved, and linked up with the more important roads.

(m) The spirit of community services must be infused by propaganda both by officials and non-officials.

(n) Regrouping of villages to establish one village Panchayat for population of not less than 2,000 is necessary.

(o) The Programme of Rural reconstruction should continue.

(p) The concessions granted under M.R.P. rules may be extended for all classes of people affected by shifting of villages.

(q) The principles of "Tiles-grant" for the depressed classes and amelioration funds may be extended to all classes of people on basis of poverty.

(r) Drinking water wells are to be deepened or increased in number where necessary.

(s) Hiduvali lands left banjar for over 5 years without sufficient cause must be acquired and the same redistributed among the landless people on "No profit and no loss" basis.

(t) The annual cattle fairs are to be encouraged to attract good variety of bulls.

(u) More provision under Taccavi loans is to be made for the purchase of iron ploughs.

(v) Rural industrial corporation on the lines suggested by Sir M. Visvesvaraya may be started at Donabaghatta under Left Bank Channel atchkat.

Statement of Channels.-Five statements showing the particulars for each of the channel are as shown hereunder.

LEFT BANK CHANNEL

1.	Name of the Channel	Bhadra Reservoir Left Bank Channel.
2.	Total length	50 miles.
3.	Number of zones	15
4.	Total extent	28,428 acres
5.	Area excluded on account of:-	
	(a) Village reserve (dry belts)	3,448 acres.
	(b) Tank bed	530 acres
	(c) High mounds	6,512 acres
	(d) Shallow, stony and waste lands.	36 acres.
	(e) Alkaline patches	8 acres.
	Net area excluded	10,534 acres

6.	Net area selected for Irrigation	(Crop Planning)
(a)	Sugarcane and rotation crop	8,272 acres
(b)	Permanent garden lands	2,811 acres
(c)	Semi-dry crops	573 acres
(d)	Permanent paddy	912 acres
(e)	Tank Atchkats	5,326 acres
7.	Number of charak villages	60 villages,8 hamlets and 4 tandas.
8.	Number proposed to be shifted	42
9.	Malaria incidence	Varies from place to place. Average spleen rate is 29.3 per cent.
10	Becharak villages in the area	15
11.	Number of tanks	313
12.	Number proposed to be breached	11 big tanks and tanks with in the dry belts are proposed and the rest are to be breached. Govt. Policy is to be awaited.
13.	Area served by the tank	6,841 acres
14.	Health unit proposed	Two primary health units.
15.	New schools to be opened	Primary 9,Middle 1, Buildings for Primary Schools 9.
16.	New Industries to be opened	Poultry-Farming, bee-keeping,mat-making.
17.	Experimental farms proposed	One
18.	Length of roads proposed	123 miles(A,B ~~and~~ C class)approach roads
19.	Live stock available	15,184
20	Agricultural implements-	
	Ploughs	Country 2,277,Iron 19
	Carts	Single 1,Double 999.
21.	Total population	13,845
22.	Indebtedness	29.5 per cent
23.	Persons holding no lands	1,187
24.	Persons holding upto 10 acres	1,968
25.	Persons holding more than 10 acres.	780

7.	Number of charak villages in the area	25
8.	Number proposed to be shifted	7
9.	Malaria incidence	The area is healthy. The average spleen rate is 9.5 %
10.	Becharak villages in the area	2
11.	Number of tanks	9
12.	Number proposed to be breached	4 (Govt.policy is to be awaited)
13.	Area served by the tanks	189 acres
14.	Health units proposed	Medical relief is inadequate.3 Health units have already been proposed.
15.	New schools to be opened	2 Primary Schools, Middle schools:nil and High Schools: nil.
16.	New Industries to be opened	---
17.	Experimental farms proposed	---
18.	Length of roads proposed	A class 20 miles, B class: nil C class: 45 miles.
19.	Live stock available	14,313
20.	Agricultural implements- Ploughs	Country 1,546,Iron 173.
	Carts	Double bullock carts 714
21.	Total population	13,257
22.	Indebtedness	39%
23.	Persons holding no lands	694
24.	Persons holding upto 10 Acres	2,101
25.	Persons holding more than 10 acres	631

MALEBENNUR BRANCH CHANNEL

1.	Name of channel	Malebennur branch channel
2.	Total length	36 miles 2 furlongs
3.	Number of zones	Twenty-four
4.	Total extent	86,242 acres
5.	Area excluded on account of-	
	(a) Village Reserve (Dry belts)	13,840 acres
	(b) Tank bed	Nil
	(c) High mounds	1,833 acres
	(d) Shallow, stony and waste lands	323 acres
	(e) Alkaline patches	163 acres
	(f) Soils other than heavy black not proposed for irrigation in zones 15 and 17.	5,821 acres.
	Total	21,980 acres
6.	Net area selected for irrigation	(Crop Planning)
	(a) Sugarcane and rotation crops	31,166 acres
	(b) Permanent garden lands	9,760 acres
	(c) Semi dry crops	6,955 acres
	(d) Permanent paddy	5,006 acres
	(e) Heavy Black	7,257 out of 11,435 acres available
	Total	60,084 acres out of 64,262 acres available
7.	No. of charak villages	72 and 3 hamlets
8.	Number proposed to be shifted	Nineteen
9.	Malaria incidence	Malaria is endemic in Sulekere area.
10.	Becharak villages in the area	Ten
11.	Number of tanks	Nine
12.	Number proposed to be breached	Three Govt. Policy is to be awaited.
13.	Area served by the tanks	255 acres

17.	Experimental farms proposed	One at Thyavanige
18.	Length of roads proposed	As noted under Malebennur Channel.
19.	Live stock available	84,422
20.	Agricultural Implements:	
	Ploughs	Country 8,634, Iron 1066
	Carts	Double bullock 5,500, single bullock 48.
21.	Total population	157,691
22.	Indebtedness	43 %
23.	Persons holding no lands	12,061
24.	Persons holding up to 10 acres	8,088
25.	Persons holding more than 10 acres.	6,072

N. MADHAVA RAO,

Chairman,
B.R.D.Committee.

K. NARAYANA MURTHY,
Secretary.

APPENDIX NO. ~~XC~~. 11

PROCEEDINGS OF THE GOVERNMENT OF MYSORE

R e a d :-

Government Order No. P.W.A. 5615-25/Irn. 1-54-101, dated 27th August, 1954 constituting an Ad-hoc Committee consisting of the Marginally noted Officers with the Revenue Commissioner as Chairman to go into the question of acquisition of lands and rehabilitation of ryots effected by the Bhadra Project and to furnish suitable proposals to Government.

1. The Special Chief Engineer, for Major Irrigation Works.
2. The Deputy Commissioner, Shimoga District.
3. The Deputy Commissioner, Chickmagalur Distt.
4. The Special Engineer, Bhadra and Tunga Projects.
5. The Special Land Acquisition Officer, Bhadra & Tunga Project, Shimoga (Secretary)

2. Letter No. Spl. L1.C.22/55-56, dated 12th September, 1955 from the Revenue Commissioner in Mysore and Chairman, Ad-hoc Committee for Acquisition of lands and rehabilitation of ryots affected by the Bhadra Project stating that the Ad-hoc Committee at the 4th meeting held on 23rd August 1955 resolved that some members of the Legislative Council and Legislative Assembly coming from the affected areas of Shimoga, Bhadravathy and Narasimharajapura be co-opted as non-official members of the above committee and forwarding proposals in that behalf, for orders of Government.

4. The functions of the Committee will be advisory in nature and will include the following:-

a. Consideration of the general policies in regard to the development of the atchkat under Bhadra Reservoir and Tunga Anticut Projects, and the measures for the development of Irrigation, agricultural practices, health, communications etc., in the area;

b. Examination of the crop planning programme in conformity with storage conditions and regulations in the reservoirs with a view to making the best use of the waters;

c. Arranging for the co-ordination of the activities of the different development agencies functioning in the area;

d. Consideration of the matters relating to the acquisition of lands and rehabilitation of ryots affected or displaced by the two projects;

e. Such subjects or classes of subjects as may be referred to it by the Government from time to time.

5. The Committee will meet at least once in 6 months at Shimoga or at the Reservoir sites or at such other places as may be appointed by the Chairman.

6. The non-official Members of the Committee with draw travelling allowance and daily allowance at the rates indicated in list "A" of Annexure 2, Section II, Mysore Services Regulations as amended from time to time.

7. The expenditure relating to the Committee will be met from the grant for the Bhadra Reservoir Project in the Budget under "68 I.N.E.D".

Sd/- H.Channiah,
for Secretary to Government
Public Works Department.

ORDER THEREON NO. P.W.A. 934-41-IRN. 10-56-1,

DATED BANGALORE, THE 11TH MAY 1956.

The system of levy of contribution and water rate in respect of irrigation projects has been in force in the State for several decades past. One of the earlier orders of Government on the subject referred to the various factors that have to be taken into account in determining the scales of contribution and water rate in any particular case. In accordance with this order, contribution and water rate are being fixed in each individual case with reference to the cost of the project, the nature of the area in which it is to be located, the estimated increase in the value of the lands benefited by it, the capacity of the prospective beneficiaries to bear the levy, the normal expenditure on the maintenance of the project, the return expected on that portion of the cost which is met by Government and other relevant considerations. There had, however, been no attempt at defining the monetary limits for the levy or at fixing the minimum percentage return or even at laying down basic principles to be followed in fixing the levy in individual cases. The question of rationalisation of the basis for the levy has therefore been under the consideration of Government for some time past. A Committee was constituted to go into the entire question and to furnish its report. The Committee after going through and reviewing--

(i) The several Government Orders which enumerate the considerations governing the levy of contribution and water rate ;

(ii) The provisions of the Minor Tank Restoration Act;

(iii) The provisions of the Irrigation Regulations of 1916 as amended in 1952 ;

(iv) The provisions of the Irrigation Act of 1932 as amended in 1952 ;

has submitted its report, a copy of which is appended hereto. The main recommendations of the Committee are briefly indicated below:

(1) No contribution or water need be levied on works costing Rs. 2,500 or less and no contribution need be levied in cases of restoration or improvement which results only in regaining the lost capacity or in assuring water supply to the existing atchkat, except to the extent of enforcing the ryots' liability for the proper maintenance of the work;

(2) As a general rule, the net return on the Government share of cost from any project costing more than Rs. 50,000 shall be not less than 3 per cent and the net return on projects costing Rs. 50,000 or less shall be not less than 2 per cent;

(3) Contribution for restoration and improvement works will be fixed at a maximum and the minimum of Rs. 300 and a minimum of Rs. 75 per acre;

(4) In the case of new irrigation works costing more than Rs. 50,000, the maximum rates of contribution to be levied will be Rs. 600 and Rs.150, respectively, while in the case of the costing Rs. 50,000 or less, the maximum and minimum will be 50 per cent of the above figures. Government shall not however be precluded from levying a higher rate of contribution when ryots owning more than two-thirds of the atchkat agree to pay it;

(5) The holders of lands benefited from the project may be given the option of paying contribution by way of surrendering from out of their holdings irrigable lands under the same project, subject to certain limits and conditions;

(6) In the case of new irrigation works costing Rs. 5 lakhs and above across streams and rivers of a perennial nature to be specified, water rate should be levied on the basis of the kind of crops raised under the project on the following scale:-

Irrigated dry ...	Rs.5 to Rs.8 per acre per annum
Paddy	Rs.10 to Rs.16 per acre per annum
Perennial including sugarcane	Rs.20 to Rs.32 per acre per annum

In the case of manurial crops like sunnhemp, the water rate will be half that for irrigated dry, provided water is supplied

(6) Whenever water rate is levied in addition to wet assessment, the total should not exceed the maximum water rate proposed by the Committee plus the dry assessment.

Government further direct that the recommendations of the Committee with the modifications indicated above be given effect to immediately in all cases where no legislation is called for. Action will be taken separately to frame suitable legislation for the purpose of giving effect to those that are not covered by the existing provisions of the Irrigation Act. The Chief Engineer is requested to send up for approval draft rules in regard to the former category of recommendations, in consultation with the Revenue Commissioner.

Sd/- D.K.Srinivasachar.
Secretary to Government,
Public Works Department.

APPENDIX No. ~~23~~ 13

Extract from Report of the Special Committee, Krishnarajasagar.

Second term of reference.

"To examine the present regulation and distribution of water supply from the Reservoir and suggest measures for improvement of duty of water."

The Visvesvaraya Committee had emphasized that with the cultivation of paddy alone, full benefit of the reservoir would not be secured, that sugarcane was more profitable and gave employment to people all round the year. As less than one-third the area was proposed to be irrigated the Committee considered that over-irrigation and saturation of soils which lead to insanitary conditions could be avoided.

In the beginning measures had to be taken to develop irrigation as quickly as possible and various concessions were shown, such as graded assessment, liberal supply of water without rigid control and tolerance of canal offences.... the control over water supply was generally being influenced by departments other than the P.W.D., whose suggestions for introducing regular system of control were not viewed with favour. The Irrigation Act passed in 1932 was not sufficiently helpful for effective control in the irrigated tract. On account of popular agitation wet irrigation was allowed to be introduced in the first section, where irrigation was not contemplated originally, giving rise to malaria ... The contemplated Block system became unworkable due to the ryots tampering with the sluices and cutting open boundaries between Blocks etc. As all

distributaries had to be kept running even during summer to supply water to patches of sugarcane, the wastage could not be stopped fully. The paddy which was about 18,000 acres in 1941-42 had gone up to 66,666 acres in 1949-50 while the sugarcane area had come down from 24,000 to 149,000 acres. The area under miscellaneous crops requiring only a small quantity of water also came down from 7,270 acres, which in itself was small, to 1,654 acres. In short sugarcane and paddy have been planted at any time, anywhere and in any quantity.

Measures for the improvement of duty of water.

(i) For utilising the seepage and drainage water, pick up weirs have been constructed in some places and they have ensured more satisfactory supply of water to the tail lands than before. Such works should be vigorously pursued and all waste water should be intercepted and utilised as far as possible.

(ii) Locking arrangement for outlets should be made more secure than at present.

(iii) The system of distributing water by volume should be tried on Gandahal Farm managed by the Agricultural Department and the Farm managed by the Sugar Factory.

(iv) Even with an improved system of locking and control some ryots may go to the extent of breaking the strongly built masonry and sluices and preventing the Department from exercising due control. We have therefore proposed under the third term of reference, for amending the Irrigation Act, for imposing imprisonment in addition to fine.

APPENDIX NO. ~~27~~. 14-A

SCHEDULE OF RATES OF LABOUR IN

MYSORE STATE

MYSORE P.W.D. No.1 B.R.C. Division

SCHEDULE OF RATES FOR CONSTRUCTION OF BHADRA DAM NEAR LAKKAVALLI FOR THE YEAR 1956-57.

Sl. No.	Items of work	Unit	Rate approved for the year 1955-56.	Rate proposed for 1956-57.
	LABOUR:-			
1.	Mason Ist class	Per day	2 0 0 to 2 15 0	2 0 0 to 2 15 0
2.	-do- II class	"	1 9 0 to 2 4 0	1 9 0 to 2 4 0
3.	-do- III class	"	1 6 0 to 1 12 0	1 6 0 to 1 12 0
4.	Stone Cutter or butt hammermen	"	1 6 0 to 1 12 0	1 6 0 to 1 12 0
5.	Carpenter Ist class	"	2 4 0 to 3 2 0	2 4 0 to 3 2 0
6.	-do- II class	"	1 13 0 to 2 4 0	1 13 0 to 2 4 0
7.	Helper II class	"	1 2 0 to 1 6 0	1 2 0 to 1 6 0
8.	Head fitter	"	2 4 0 to 3 2 0	2 4 0 to 3 2 0
9.	Assistant Fitter.	"	1 6 0 to 1 12 0	1 6 0 to 1 12 0
10.	Blacksmith I class	"	2 4 0 to 3 2 0	2 4 0 to 3 2 0
11.	-do- II class	"	1 13 0 to 2 4 0	1 13 0 to 2 4 0
12.	Blaster.	"	1 13 0 to 2 11 0	1 13 0 to 2 11 0
13.	Blaster helper	"	1 6 0	1 6 0
14.	Bellow man	"	0 11 0 to 1 2 0	0 11 0 to 1 2 0
15.	Painter Ist class	"	1 13 0 to 2 11 0	1 13 0 to 2 11 0
16.	-do- II class	"	1 6 0 to 2 0 0	1 6 0 to 2 0 0
17.	Male coolies	"	1 2 0 to 1 5 6	1 4 0 to 1 8 0
18.	Women coolies	"	0 12 0 to 1 0 0	0 12 0 to 1 0 0
19.	Boy or Girl coolie	"	0 7 0 to 0 10 0	0 7 0 to 0 10 0
20.	Stone Woddar	"	1 6 0 to 2 0 0	1 6 0 to 2 0 0
21.	Boyee male coolie	"	1 6 0 to 1 9 0	1 8 0 to 1 12 0
22.	Boyee female coolie	"	0 14 0 to 1 2 0	0 14 0 to 1 2 0
23.	Boyee boy or girl coolie.	"	0 9 0 to 0 12 6	0 9 0 to 0 12 6
24.	Malabar coolie	"	1 9 0 to 1 13 0.	1 9 0 to 1 13 0
25.	Boat man	"	1 6 0 to 1 13 0	1 6 0 to 1 13 0
26.	Raft man	"	1 2 0 to 1 9 0	1 2 0 to 1 9 0
27.	Watch coolie	"	1 4 0 to 1 6 0	1 4 0 to 1 6 0
28.	Electric wire man - I class	"	2 4 0 to 3 2 0	2 4 0 to 3 2 0
29.	-do- II class	"	1 13 0 to 2 4 0	1 13 0 to 2 4 0
30.	Pathan coolie	"	2 13 0 to 3 4 0	2 13 0 to 3 4 0
31.	Hammer man	"	1 4 0 to 1 6 0	1 8 0 to 1 12 0
32.	Navagani maistry	"	2 4 0 to 3 6 0	2 4 0 to 3 6 0
33.	Chavalies or navagani	"	1 12 0 to 2 6 0	1 12 0 to 2 8 0
34.	Mechanic Ist class	"	2 4 0 to 3 2 0	2 4 0 to 3 2 0
35.	-do- II class	"	1 13 0 to 2 4 0	1 13 0 to 2 4 0
36.	Foreman in grade.	Per month	100-5-150	100-5-150
37.	Mason maistry.	Per day	2 4 0 to 3 2 0	2 4 0 to 3 2 0
38.	Chisellers	"	2 0 0 to 3 0 0	2 0 0 to 3 0 0
39.	Measures	"	1 2 0 to 2 4 0	1 2 0 to 2 4 0
40.	Literate coolie	"	1 6 0 to 2 4 0	1 6 0 to 2 4 0
41.	Laboratory attenders	"	1 6 0 to 1 13 0	1 6 0 to 1 13 0
42.	Electric Attenders	"	1 6-0-	1 6-0-
43.	Telephone attenders.	Ingrade	30-1-35	30-1-35
44.	Gurkha Watchman.	"	45-3-60	45-3-60
45.	Tool keeper	Per day	1 6 0 to 1 9 0	1 6 0 to 1 9 0
46.	Labour maistry.	"	-	1 12 0 to 2 4 0

Sd/- Executive Engineer,
No. 1 BRC Division.

APPENDIX NO. ~~26~~ K1 - C

RATE ANALYSES FOR MASONRY FOR DAM
IN LIME SURKHI MORTAR (1:4) & Composite
MORTARS.

RATE ABSTRACT No.6.

FOR RUBBLE MASONRY IN CEMENT MORTAR 1:3

(CALCULATION FOR * 100 cft OF MASONRY)

1. Cost of Materials:

One unit of masonry required 66% of rubble and 42% of mortar.

Cost of 66 cft. rubble at Rs 68/- per unit including 2nd conveyance and temporary establishment.		44-14-0
2. Cement Mortar:		
42/3 14 cft. of cement or 11 bags at 5-8-0	60-8-0	
42 cft. of sand at 2-10-0 per cyd.	4-1-0	
	64-9-0	64-9-0
3. Labour Charges:		
As per Rate Abstract No.4 for rubble masonry in Surkhi Mortar 1:4. Mixing cement and sand: 1 Boyee Male Coolie at 1-8-0		26-0-0
4. Miscellaneous charges:		
i) Illumination charges at 0-0-3 per cft.	1-9-0	
ii) Curing charges at 0-0-6 per cft.	3-2-0	
iii) Construction of labour sheds at - 0-0-6 per cft.	3-2-0	
Unforeseen charges.	0-8-0	
	8-5-0	8-5-0
Total for 100 cft.		143-12-0

For 100 cft. 143-12-0

For 1 cft. $\frac{143\text{-}12\text{-}0}{100}$

= Rs 1-7-0 per cft.

APPENDIX NO. 27.

Rate Abstract No./14
FOR PROVIDING AND FIXING 4' x 2' Block Stones FOR THE SIDE WALLS OF BHADRA DAM.
4 Sets of chavalies will convey an average 5 stones per day with a lead of 600.
10 stones can be carried to work spot and fixed in position per day undressed quantity 10 x 4 x 2 = 160 Cft.

1) Cost of Materials.

Raw stones 160 Cft. at 2/- per Cft.		320-0-0
Dressing 3 line dressing: 10 x 2 x 2 : 40 Sft. at Rs. 1/-		40-0-0
Quantity of dressed stone. One line dressing 4 x $\frac{10 \times 2+1'-10'}{2}$ x 4 = 308 Sft @ 0-6-0		115-8-0
Cement mortar 1:2=30 Cft. Sand 30 Cft at 2-10-0 per Cyd including 2nd conveyance.	2-12-0	2-12-0
Cement 30/2-20 x 0, 8-16 Bags at Rs. 5/8		66-0-0
Cement concrete 1:2:4-10 Cft at Rs. 1-14-0		18-12-0
Total:		563-0-0

Labour Charges

4 Masons Ist class at 2/8 per day.	10-0-0
2 Chisellers at 2/8 per day.	5-0-0
2 x 4 x 4 -32 chavalies at Rs.2/8/- per day.	76-0-0
Two Yoddar male collies at Rs. 1/6/- per day.	2-12-0
6 Vodder female colies at Rs. 1/- perday	6-0-0
One boy or girl cooly at 0-7-0	0-7-0
One malabar type cooly at 1/9 per day.	1-9-0
Miscellaneous	2-4-0
Total:	104-0-0

ABSTRACT

1. Cost of Materials.	563-0-0
2. Cost of labour.	104-0-0
Total:	667-0-0

Quantity of masonry construction of joints (1/2" joints) 160 Cft: 165 Cft.

For one cubic foot $\frac{667}{165}$ =4-0-8 or 4-0-0

Rs. 4-0-0/Cft.

APPENDIX NO. ~~28~~. 14 - D

RATE ABSTRACT

FOR CUT STONE MASONRY FOR THE SPILLWAY SECTION OF DAM IN 1:2 CEMENT MORTAR INCLUDING ANCHORING THE STONES WITH 3/8" TO 1/2".

DIAMETER RODS

(Basis for calculation: 100 Cft)

1. Cost of Stone:

75 Cft of dressed stone is required for constructing 100 Cft of masonry.

Raw stone required is 95 Cft at Rs. 182/100 Cft.		174-0-0
Dressing and stacking charges at Rs.1/- per Cft. for 75 Cft.		75-0-0

Cost of Cement Mortar 1:1½:3 Proportion:

Out of 30 Cft of mortar 10 Cft to be filled in with 1:1½:3 concrete with jelly granite as aggregate i.e., 10 Cft of jelly at Rs.10/- per Cyd.	3-12-0	
5 Cft, of sand at Rs.2-10 per Cyd.	0-3-0	
2¾ bags of cement at Rs.5-8-0 per bag.	15-2-0	
The rest 20 Cft with cement mortar 1:2 ¾ Cyd of sand at Rs.2-10-0 per Cyd.	1-15-0	
3½ bags of cement at Rs.5/8/- per bag.	45-6-0	
	66-11-0	
Lorry charges for 2nd conveyance.	1-13-0	
average 2 miles at Rs. 0-14-0		
	68-8-0	68-8-0

⅜" M.S. Roads (Average 10 stones) in one unit joint of construction) 10 x 8 = Rft.
for Horizontal Surface joints

10 x 5⅓ - 53⅓ Rft
133⅓ Rft.

Page 265/Royndolds.

Weight 0.375 Lbs per Rft or 0.46 Cwt at Rs. 600/Ton.		14-0-0
<u>Construction Charges.</u>		
Mixing mortar 30 Cft Malabar Type cooly for ½ day at Rs. 1-13-0	0-15-0	
Conveyance of mortar 3 Boyee Females at Rs. 1-2-0 per day.	3- 6-0	
Two Boyee females for conveyance of chips at Rs. 1-2-0 per day.	2-4-0	
2 Boyee females for clearing at Rs.1-2-0 per day.	2-4-0	
4 Sets of Chavalies at Rs.2-6-0 each.	38-0-0	
8 Masons 1st Class at Rs.2-15-0 each.	23-8-0	
1 Mason Maistry at Rs.3-0-0 each.	3-0-0	
4 Chisellers for giving fluid shape at Rs. 3/-	12-0-0	
<u>Binding Rods.</u>		
1. Fitter at Rs.2-8-0 per day.	2-8-0	
2. Water boys at Rs.0-8-0 per day.	1-0-0	
<u>For Grouting.</u>		
1 Mason at Rs. 2-15-0	2-15-0	
2 Malabar type at Rs. 1-13-0	3-10-0	
4 Boyee females at Rs.1-2-0 per day	4- 8-0	
2 Boyee male coolies at Rs.1-8-0 per day.	3- 0-0	
	102-14-0	102-14-0
		3-10-0
		438-0-0

Miscellaneous Charges.

Total for 100 Cft.

For one Cft 438/100 - Rs.4-6-0 per Cft.

EXECUTIVE ENGINEER,
NO. I.B.B.C. DIVISION.

APPENDIX NO. ~~89.~~ 14-E

RATE ANALYSIS FOR FACE STONE

MASONRY FOR DAM IN 1 : 4 LIME

SURKHI MORTAR

RATE ABSTRACT NO. 7

FOR CONSTRUCTING FACE STONE MASONRY IN SURKHI MORTAR 1 : 4.

Unit for calculation: 100 Cft)

Bond Stones:-

Cost of 100 C.ft. of bond stones supplied at Dam Site.	166-0-0
Cost of 2nd Conveyance.	12-0.0
	178-0-0

Face Stones:-

Cost of 100 Cft of face stones to be supplied at Dam site. 137-8-0	
Cost of 2nd conveyance. 12-0-0	149-8-0

Note:-

In 100 Cft of face stone masonry 68 Cft of face stones & 12 Cft of bond stones and 30 Cft of Surki Mortar will be used.

Cost of 12 Cft of bond stones at 178/-per 100 Cft. = 21-5-0	
Cost of 68 Cft of face stones at 149-8-0 per 100 Cft. =101-11-0	123-0-0

Cost of Surki Mortar:

Cost of 30 Cft of Surki mortar 1:4 at 21-12-0 per Cyd.	24-3-0

Contd.

Miscellaneous Charges.

Illumination charges at 0-0-3 per Cft.	1-9-0
Curing charges at 0-0-6 per Cft.	3-2-0
Construction charges for ramps etc. at 0-0-6 per C.ft.	3-2-0
Construction of labour sheds at Rs.0-0-6 per Cft.	3-2-0
Tools & Plant at 0-1-0 per Cft.	6-4-0
	17-3-0

ABSTRACT

Cost of stones	123-0-0
Cost of Surki Mortar	24-3-0
Labour charges	35-15-6
Miscellaneous charges	17-3-0
	200-5-6

THEREFORE ONE CFT $\frac{200\text{-}5\text{-}6}{100}$ =

2-0-6 or Rs. 2/- Per Cft.

Labour charges including dressing of Stones to shape etc.		
2 Chisellers at 2-8-0 per day	5-0-0	
4 Masons at 2-8-0 per day	10-0-0	
1 Set of 4 Chavolies at 2-6-0 per day.		
6 Boyee female coolies for conveanning mortar at 1/-	6-0-0	
1 Boyee male cooly for cleaning & 1 boy cooly for watering at 1-8-0 & 0-7-0 respectively.	1-15-0	
2 Gadaga Voddar male cooly at 1-6-0 per day for conveying gadages.	2-12-0	
Malabar type cooli at 1-9-0 per day for ½ day.	0-12-6	
		35-15-6

APPENDIX No. ~~30~~ 14-F

Actual cost of manufacturing Surkhi mortar (1:4)

Burning lime

i) Kankar 1,000 units at 98/-	98,000- 0
ii) Wood fuel, 1815½ tons @ 11/-	19,970- 8
iii) Charcoal 1616 bags of 80 lbs.	3,181- 8
iv) Pro-rata cost of kilns	971- 5
v) Labour for burning and stacking	12,113-11
Total	1,34,237/-

Lime produced : 971.35 units.

Cost of lime = $\frac{134237}{971.35}$ = 138/2 per 100 ~~cft.~~

Surkhi mortar.

Surkhi used 2504 units.	65,889- 6
Burnt lime 526 units.	71,220- 4
Conveyance, yard to mills	4,313- 3
Grinding charges- labour	12,933- 0
mech.	5,651-12
Power charges	6,230-15
Pro-rata on mortar mills	6,707- 0
Supervision and miscellaneous	487- 4
Sundry Tools and Plant	145- 0
Sundry (pro-rata) trolly lines, repairs of kilns sheds etc.	579-11
	1,74,640- 7

Rate = $\frac{174640}{2504}$ = 69-11-6 per 100 cft. of mortar (1:4)

APPENDIX No. ~~21~~ 14-G

ESTIMATED RATES FOR RUBBLE MASONRY IN SURKHI-MORTAR 1:4 IN DAM, FOR DIFFERENT HEIGHTS.

APPENDIX NO. 15

STATEMENT OF PLANT AND MACHINERY ON

LAKKAVALLI PROJECT

Mech. Equipment

			Cost.
1.	10 Tippers		168,664
	10 Trucks - 3.5 tons		222,495
2.	2 Heavy duty El. pumps, Al. 10" Section		33,000
3.	1 Drill		24,978
4.	8 Jeeps		96,349
			5,45,486
5.	315 CFM Compr:		
	1 Stragger r.c.o. 2/32 type Durin Flat Engine	285,000	99,000
	3 Atlas Diesel Electric	70500	
6.	210 CFM compr.		
	2 Stragger V.G. 0.2 type Durin Stragger Engine	40,420	97,560
	1 Broomwade, 500 C.F.M. stationery, El. durin	57140	
7.	1 wagon drill, climax		14,000
8.	79 Shank (Silt) (Consumable)		
10.	6 Hand grinders (Best & Co.)		4,548
12.	1 Marion Crane 4.71 series 75' boom		2,59,625
13.	1 Gotwald crawler crane, 3 T. 30' rod.		1,21,288
	2 Prestman Cranes, Crawler, 1 T. 28' boom.		
14.	3 Rear dumpers, Let oureau diesel 13/17 c.y.	5,06,929	
15.	300 tippins trolleys (1c.y.)		1,41,000
16.	4 ACEC, 50 H motors with starts 2 Kirloskar 50 H motors -do-		32,730
17.	3 Allis Chalmers HD 20 Tractor with attachment.		4,51,622

18.	3 cats D 7 incl. ripper	3,93,810
19.	3 cats D 6 with sheeps ft. rollers.	2,59,204
20.	6 car DW 10 Scraper 12/15 c.y.	8,35,683
21.	38 Mortar mills with belt	1,71,800
22.	G.I. pipes 3" 14,218 rft.	39,810
23.	" " " 2" 4,030 "	6,793.
24.	" " " 1½" 6,012 "	783
25.	" " " ¾" 20,085	14,565
	Total :-	42,86,880

Mech. Equipment

27.	13 Roto pumps for	7 Holman 6 CPT	20,000
28.	21 1.cyd. mixers		97,930
29.	10 oil Engine pumps		36,000
30.	Transformers		48,720
31.	1 Station Wagon		15,665
	Workshop Machinery		
	1. H.P. Lathe	20,819	
	1 Plaining machine		4,800
	1 Shaping machine		
	1 Vert. bending machine		
	1 Tool guide		
	1 Punching machines.		
	1 Marking out table		
	1 Laminated spring making machine		
	1 Slotting machine		
	1 Radial drilling machine		
	1 Plate bending		
34.	Low platform trains 30 T.		1,25,906
35.	40 Seater bus		32,050
36.	5 T.truck Austin		11,500
37.	3 Water lorries		6,000
38.	3 Air Hoists		5,314
39.	2 Diesel rollers		71,084
40.	1 Morten overloader		32,624
41.	36 Kirloskar pumps		70,300

APPENDIX NO. ~~30~~ 16

LIST OF MACHINERY REQUIRED FOR HIREMALALI TUNNEL WORKS - RIGHT BANK CHANNEL - SECOND SECTION - BHADRA RESERVOIR.

"ABSTRACT"

Sl.No.	Sub-Head		Cost in Rs.
1.	PNEUMATIC EQUIPMENTS	..	5,60,000
2.	HOISTING EQUIPMENT	..	4,69,000
3.	DRILLING EQUIPMENT	..	6,07,800
4.	(a) PUMPS	..	2,80,000
	(b) COLONY WATER SUPPLY	..	16,000
5.	ELECTRICAL EQUIPMENT	..	6,83,500
6.	TRANSPORT EQUIPMENT	..	4,01,000
7.	MISCELLANEOUS TOOLS & PLANT	..	4,08,300
8.	WORKSHOP	..	93,500
9.	TELEPHONE EQUIPMENTS	..	30,000
			35,49,100
10.	SPARE PARTS 10 PER CENT OF ITEMS 1 TO 9 (APPROX.)		3,54,910
			39,04,010
		or say	39,04,000

Note:- The Abstract Estimate comprises not only the machinery required for tunnelling but also for other services such as, water supply and lighting to colony etc.

LIST OF MACHINERY URGENTLY REQUIRED FOR HIREMALALI TUNNEL FOR THE RIGHT BANK CHANNEL SECOND SECTION OF THE BHADRA RESERVOIR AS DESIDED BY THE MEMBERS OF THE SUB COMMITTEE OF STANDING TECHNICAL ADVISORY COMMITTEE ON 6-12-1956 IN THE CHAMBERS OF THE CHIEF ENGINEER, MAJOR IRRIGATION (SOUTH), BANGALORE:

Sl. No.	Equipment required for tunnel works - Bhadra Reservoir	Number required			Remarks.
		No.	Rate	Cost	
1.	2.	3.	4.	5.	6.
	I. PNEUMATIC EQUIPMENTS				
1.	Stationery (preperably rotary typed) Air Compressor unit delivering in all 750 C.F.M. free air between 100 to 120 P.S.I. with accessories etc. complete Electrically driven.	6	60,000	3,60,000	
2.	(Stand by) Mobile Air Compressor delivering 600 CFM. of free air at 100 to 120 PSI with accessories etc. complete Diesel Engines Driven.	4	50,000	2,00,000	Reported available.
3.	Air Duct 6" and water duct 3" adequate lengths			5,60,000	
	2. HOISTING EQUIPMENT				
1.	Pit head frame as per specification.	4	15,000	60,000	Two pit head frames and 4 hoists should be obtained immediately.
2.	Winch winding double drum hoisting gear electrically operated reversable mortor of 40 H.P. with safety devices like level indicater and lilly controller etc. to operate two cages for accommodating loaded trolley or mine car with one cubic yard of loose rock.	4	15,000	60,000	
3.	Cages to accommodate 1Cyd. capacity mine cars	10	2,500	25,000	
4.	Tugger Hoists electrically operated of double drum of 30 H.P.	2	12,000	24,000	For portals.
	Or, Dumpers of 4 - 4½ Cyd. capacity.	4	75,000	3,00,000	
				4,69,000	

(Cost of Tugger hoists is considered)

1.	2.	3.	4.	5.	6.
	3. DRILLING EQUIPMENT				
1.	Drilling platforms	6	6,000	36,000	
2.	(a) Drill rods 2 ft. 7 inches long.	700	60	42,000	
	(b) -do- 7 ft. 10 "	600	80	48,000	
	(c) -do- 10 ft. long	200	90	18,000	
3.	Wet Jack Hammers 45 lbs. class to give 8" to 12" drivage per minute	60	800	48,000	
4.	Air Legs for operating jack hammers	60	500	30,000	
5.	Mine Car Loaders of suitable capacity	12	20,000	2,40,000	
6.	High Pressure Blower 21" Dia.	4	4,200	16,800	
7.	Exhaust Fans 12,000 to 15,000 CFM (to serve as blower also)	6	5,000	30,000	
8.	Exhaust Ducting with coupling and hangers	12000ft.	8	96,000	
9.	Electric Grinder	6	500	3,000	
				6,07,800	
	4. (a) PUMPS				
1.	Pneumatic sludge pumps 2½" to 3" size 100 G.P.M. at 50 ft. head.	10	1,000	10,000	
2.	Electrically driven pumps 60 H.P. 500 GPM at 250 ft. head	12	10,000	1,20,000	
3.	Diesel Engine pumps of capacity 500 GPM against 300 ft. head	6	20,000	1,20,000	
4.	Electrical pumps 30 to 40 H.P. 200 GPM against 250 ft. head	6	5,000	30,000	
				2,80,000	
	4. (b) COLONY WATER SUPPLY				
1.	Colony Water supply pump 160 GPM against 400 ft. head, Electrically driven 50 H.P.	2		8,000	16,000
	5. ELECTRICAL EQUIPMENTS (FOR COLONY & TUNNEL)				
1.	Flood lights electrical (Pneumatic)	50		300	15,000
2.	Bare Copper of sizes	30 tons		5,000	1,50,000

1.	2.	3.	4.	5.	6.
3.	Electrical lamps with holders of various capacity	7,500	4	30,000	
4.	Insulated wire of sizes	1,000	200 (coils)	2,00,000	
5.	M.S. Rails (25lbs. per year)	1,000	125	1,25,000	
6.	Goose neck fittings	500	40	20,000	
7.	Insulators of various capacities.	5,000	5	25,000	
8.	Wires, turn buckles etc.	L.S.		15,000	
9.	Transformers 300 KVA	9	11,500	1,03,500	
				6,83,500	

6. TRANSPORT EQUIPMENT
(FOR WORKS OTHER THAN ACTUAL TUNNEL)

1.	Diesel lorries with 5 tons capacity with body complete	5	25,000	1,25,000
2.	Water tank with 1,500 gallons capacity	2	3,500	7,000
3.	Water tanker tractor with Trailer	2	12,000	24,000
4.	Fire Engine	1	30,000	30,000
5.	Jeeps	1	15,000	15,000
6.	Ambulance Van	1	20,000	20,000
7.	Diesel Locos 2 ft. guage 15 to 20 H.P. (to be modified if dumpers are used)	6	30,000	1,80,000
				4,01,000

7. MISCELLANEOUS TOOLS & PLANT ARTICLES

1.	Portable type concrete mixers (10/7 Cft.)	4	12,000	48,000
2.	Pump crete machine with pump and hose pipe complete 10½ Cft. capacity per minute single barel or pneumatic concrete placer.	2	60,000	1,20,000
3.	Concrete vibrators Electrical	12	2,200	26,400
4.	-do- Pneumatic	12	2,200	26,400
5.	Mine cars with 1 Cyd. with Taper roller bearings capacity (to be modified if dumpers are used)	100	800	80,000

1.	2.	3.	4.	5.	6.
6.	Two ft. guage 26 lb. to 37 lbs. Trolley track at top and bottom	30,000 ft.	1Ø4/0 per ft.	37,500	
7.	Crossing and switches	40	500	20,000	
8.	Sleepers (2,000 dog spikes Fish plates bolts etc.)	L.S.		50,000	
				4,08,300	

8. WORKSHOP EQUIPMENT

1.	Lathes with independent drives 10" size	1	20,000	20,000
2.	Drilling machine capacity upto 2"	2	6,000	12,000
3.	Electrical Welding plant	2	4,000	
4.	Gas welding equipment with accessories	2	1,500	3,000
5.	Hack-saw machine with independent drive and other accessories	1	2,500	2,500
6.	Wet and dry grinding machine with attachements	1	1,000	1,000
7.	Electric siren	1	1,500	1,500
8.	Electric blower for smith section.	1	1,500	1,500
9.	Power Hammer	1	12,000	12,000
10.	Inflating, compressores (Portable) with electric motor 5 h.p.	1	5,000	5,000
11.	Other equipments for workshop including tools required for workshop.	L.S.		27,000
				93,500

9. TELEPHONE EQUIPMENT
(6 MILES LENGTH)

1.	M.S. Rails	100	125	12,500
2.	Magneto Telephones	30	150	4,500
3.	C.D. Wire	3 tons	1,000	3,000
4.	Guy wire, Cross arms etc.	L.S.		2,000
5.	Insulators pin and strain type	8000	4	3,200
6.	Insulators of wire of different capacity	10 coils	80	800
7.	Miscellaneous requirements	L.S.		2,000
				28,000

10. SPARE PARTS

1.	Spare parts for machinery at 10 per cent of machinery 1 to 9 (approximately) and any additional equipment as may be needed.			3,54,910

COMMITTEE ON PLAN PROJECTS

Main Recommendations of the Study Team for Irrigation & Power

(LAKKAVALI PROJECT)

(1957)

The project is designed to impound 90,000 million cubic feet of water on the River Bhadra, irrigating 2,34,000 acres of land in Mysore State, and generating 25,000 Kw firm power, installed capacity being 40,400 Kw.

2. The project was initially started in 1947 and at the time of writing this report i.e. by June 1957, an expenditure of roughly 9 crores was incurred out of Rs. 24 crores, the estimated cost of the project. The dam is raised to nearly half the total height and irrigation was started on the left bank canal during the last year (1956-57). The excavation of the main canal is nearly complete in the first 50 miles, beyond which it has to cross a hill range through a tunnel, approximately 2¾ miles in length. This tunnel is yet to be started, to facilitate which special machinery worth about Rs.30 to 40 lakhs would be necessary and the Team has recommended to Government of India to release the necessary foreign exchange required to purchase such of the machinery as might not be available from the surplus on other projects in the country. The Government of Mysore have been aware of the urgency of this work and are now busy in taking all the necessary steps to expedite the execution, since the project is scheduled to deliver irrigation water up to the tail end by 1961 June. Also, the report has suggested an alternative list of machinery which would save about Rs.10 lakhs.

3. The Irrigation and Power Team noted that there was another factor holding up the execution of the canal beyond the tunnel portion viz. the problem of by-passing the Shantisagar Reservoir, within a few miles after the tail of tunnel. This

problem could be solved by recourse to any one of a number of alternatives which were being discussed by the Mysore Engineers. The Team of Engineers and the Members of the Consultative Committee after discussing the matter with the State Engineers, proposed one of the alternatives, which happens to be the easiest and cheapest bringing a saving of Rs. 20 to 50 lakhs over the other possible alternatives.

4. The Team has found the construction staff is generally sufficient and efficient. However, they have made recommendations to strengthen the organisations in charge of the designs and quality control over construction materials and techniques.

The report reveals that the establishment charges on this project are only 4% of the outlay, as against 10 to 12% as considered normal by the Engineers Seminar. The reasons for this are reported to be mainly due to the very low scales of salaries prevailing in the State and partly due to the understaffing as mentioned before.

5. The report suggests the creation of another Circle under a Superintending Engineer to take up the construction of the Hiremalali Tunnel and the works beyond, so as to enable finishing of the work before the scheduled date.

6. The Report appreciates the Mysore practice of appointing a Standing Technical Advisory Board, consisting of the Chief Engineers of the State and retired Chief Engineers of the State and presided over by the Minister for P.W.D. The Engineers work almost honorarily and provide an excellent

consultation at all the stages of planning, designing and execution of projects. This practice is recommended for emulation by other States engaged in construction of development projects.

7. The Report notes with appreciation the excellent manner in which the problem of Development of irrigation has been tackled by the Mysore Government, who appointed a Committee known as Bhadra Reservoir Development Committee consisting of a Revenue Commissioner as a Chairman, with Chief Engineer, Director of Agriculture, Director of Public Health and the Superintending Engineer of the Project, as members. This Committee prepared the Irrigation Development Report, which not only surveyed all the irrigable area from irrigation point of view, but also from agricultural and health point of view, and prepared zone maps for irrigation with the proposed crop patterns for each village.

8. To implement the recommendation of the above Committee, another Committee was appointed, so as to expedite actual development of irrigation on the pattern set and enable the State and Society to realise the benefits of the Scheme without loss of time as soon as the irrigation facilities become available.

9. The State has also seen to it to decide the Betterment Levy etc. However, the report reveals a scope for and recommend~~ations~~ recourse to upward revision of water rates, as they are lower than those obtained in the Bombay State. In order that the

irrigation management and administration should not be slack and hap-hazard, the report recommends the adoption of the Block-system and the Canal Rules and the system of irrigation management, as practised in the Bombay State, as far as possible.

10. As Bhadra is an InterState River Basin of Tungo Bhadra Valley, which covers the erstwhile States of Mysore, Hyderabad and Madras, the utilization of the waters by the different States is subject to an agreement reached between these three States. With the recent reorganization of the States, the position has changed and it is only Mysore and Andhra Pradesh that have rights over those waters. Hence the report points out the need for revising this agreement. Also, it is recommended that the earlier restrictions in regard to carrying over the waters in the Bhadra Reservoir from year to year should be removed as such a carry-over would increase the firm electrical energy out-put annually, without affecting the interests of the States lower down.

11. The report appreciates the fact that this project is mostly carried out by utilizing only the local labour and material, without adopting much mechanisation, and avoiding rare and costly building materials like cement which are very sparingly used, as the bulk of the masonry is all in lime mortar.

12. In conclusion the report recommends expeditious sanction of adequate funds for the project to enable its completion within the target date.

—

Paragraph No. (1)	Recommendations made in the Lakkavali Project (2)	Comments of Mysore Government. (3)
1.Scope of Project:		
1.2(i)	It is suggested to negotiate with tenderers for supply of electrical machinery, to provide for overload capacities upto 6000 K.W.so as to enable utilising the waters for generating more electricity during the initial stages of irrigation when full demand for irrigation would not have been developed.	Accepted.
1.2(ii)	There is a need to replace the old Madras-Hyderabad-Mysore agreement by a new Andhra-Mysore agreement, with a proviso to allow Mysore to keep a carry-over to be utilised in lean years, which would increase generation of firm electricity every year without detriment to the interests of Andhra, in addition to warding off shortages in lean years.	Accepted.
2.Administra--tion.		
2.6(i)	It is recommended to create an additional Circle under a separate Superintending Engineer, charged with the execution of the Hiremalali Tunnel and all the canal works lower down the Tunnel, with a view to completing the project in time.	Accepted.

(1)	(2)	(3)
2.6(ii)	It is recommended to create a Central Designs Organisation, directly under the Chief Engineer, Major Irrigation Projects, with its branch offices located at the Superintending Engineer's headquarters, to keep a laison between the field officers and the Central Cell. The exact staff etc. required for this Organisation is to be worked out by the State authorities.	Accepted.
2.6(iii)	With a view to making available the services of the Research Station at Krishna Raj Sagar to the projects, promptly, the Research Officer may carry out research for the Project under guidance of and report direct to Chief Engineer, Major Irrigation instead of through Chief Engineer (General), as, then the Research Officer can promptly carry out his responsibilities, after establishing direct contacts with the field Engineers.	Accepted.
2.6(iv)	Strengthening of field laboratory on the Project and appointing a special senior Execu--tive Engineer in charge of quality control and laboratory to be responsible to Chief Engineer, direct is recommended.	Accepted.

(1)	(2)	(3)
2.6(v)	Training of Storekeepers in a proper way, with or without the help of outside agencies like Commerce Colleges, with a view to keep the store accounts in a trim order is recommended.	Accepted.
3. Phasing of construc--tion progra--mme.		
3.3	Partially raising the dam to level 106' instead of 98' by June 1958, as already planned is suggested so as to achieve irrigation of about 50,500 acres during 1958-59 on Right Bank Canal.	Accepted.
3.5	It is urged that the tunnel should be completed in 2 years time i.e. by June 1959, and the rest of the canal by June 1961.	Accepted.
4. Features of Design and construction.		
4.2	Providing Field Control Laboratory (Soil Mechanics) for the earth dams is suggested.	Accepted.
4.3	It is recommended to install instruments measuring deflection, temperatures, uplifts & stresses of Masonry Dam & consolidation, settlement and porepressures of earth dams.	Accepted.

(1)	(2)	(3)
4.6	It is proposed to standardise the ingredients of and technique of preparing Lime Surkhi Mortar with a view to minimising the variation in the strength of mortar as now noticed. It is already suggested before to have a quality control Organisation.	Accepted.
4.7	In general, the earth moving machinery is not utilised to their full life and they need to be employed on more gainful works, with greater efficiency.	Accepted.
4.8	It is proposed to discontinue the practice of subclassifying soil, murum, soft rock and rock which has proved impracticable and unnecessary and which might lead to disputes and abuse.	Accepted.
5.Canal Works.		
5.2	Alternative scheme of machinery for the Tunnel is suggested by the team, which would result in a saving of Rs. 10 lakhs on the projected outlay on Machinery for this purpose.	Accepted.
5.3	The team has suggested as per appendix 8 to take the Davangere Branch of the channel from over the Shantisagar Bund, in an R.C.C. trough, a proposal which would be cheaper than the rest of the alternatives by 20 to 54 lakhs.	Accepted.

(1)	(3)	(3)
6. Development of Irrigation.		
6.11	There is a scope for upward revision of water rates, comparing the rates in Mysore with those in Bombay etc.	Accepted.
6.13	Adoption of Bombay's pattern of Irrigation Administration and Management, wherein the Irrigation Development controls the management, which includes regulation of canals, preparing irrigation programmes annually, checking unauthorised irrigation, waterlogging and salt efflorescence, providing drainage schemes, preparing assessment papers and fixing up crop patterns etc. etc.	Accepted.
6.14	Block system should be enforced to avoid hap-hazard development of irrigation as has happened in the case of Irwin Canal.	Accepted.
7. Generation of Electricity.		
7.5	In order to accept a firm additional load of 25,000 K.W. at the load factor of the system, it would be necessary to carry over waters from surplus years to lean years.	Accepted.

(1)	(2)	(3)
7.6	Overload capacity should be provided for and negotiations should be carried out with suppliers of machines to this effect so as to enable generation of more power.	Accepted.
7.7	The monsoon inflow in the reservoir should be so regulated as to have the reservoir full (186') by 1st October and depeted to lowest level by June next. In case the Monsoon is found too weak to fill the tank, the discharges at riverbed should be suitably reduced, so as to obtain a level of reservoir as near to 186' as possible at the end of monsoon.	Accepted.
8.Construc--tion costs.		
8.7	Steel is being used on canal (acqueducts) and there may be scope for saving the same (by replacing R.C.C.by masonry and plain concrete arches.)	Accepted.

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S.No.(1)

No.COPP(1)/5/57.
Committee on Plan Projects
Planning Commission,

Reserve Bank Building,
Parliament Street,
New Delhi.

New Delhi,
February 7, 1957.

From

Shri Indarjit Singh,
Joint Secretary, Finance and
Secretary, Committee on
Plan Projects.

To

The Chief Secretary,
Govt. of Rajasthan, Jaipur.
Govt. of Madhya Pradesh, Bhopal.
Govt. of Mysore, Bangalore.

Sub. Organisation of investigations into Irrigation and Power Projects by the Committee on Plan Projects.

Sir,

In pursuance of paragraph 2(1) of Planning Commission letter No. PC(CDN)/23/56, dated September 20, 1956, the Committee on Plan Projects has decided to organise a study of Chambal and Lakkavali (Bhdra) Irrigation Projects. The Terms of Reference of the Team are given in an A nnexure to this letter.

2. The Leader of the Team will be assisted by a Consultative Committee of senior Engineers, who, after necessary visits to the Projects concerned, will formulate an outline of a plan for the evaluation of the Projects. The Team proper will conduct investigations in accordance with the plan laid out subject to such discussions as the Leader of the Team may think necessary with the Consultative Committee during the course of the investigations.

3. The Leader of the teams for the both the Projects will be Shri N.V. Gadgil, M.P. The Consultative Committee

to advise him would consist of the following:

1. Shri A.N. Khosla, Vice Chancellor, Roorkee University.

2. Shri N.N. Iengar, Adviser, Tata Power Co.

3. Shri Thirumale Iyengar, Chief Engineer, Hirakud.

4. Shri R.K. Gupta, Managing Director, National Projects Construction Corporation.

A person with experience of Works accounts and finance may be invitedto serve on the Consultative Committee later.

4. The names of the members of the Team will be intimated shortly. It is requested that the necessary facilities may be given to the Consultative Committee and the Team for the study of the Projects.

Yours faithfully,

Sd/-
(Indarjit Singh)
Joint Secretary, Finance
&
Secretary, COPP.

Copy, with a copy of the enclosure, forwarded for information to:

(1) Chief Secretaries of all other State Governments/Administrations.

(2) Secretaries of all the Union Ministries.

(3) Leader of the Team.

(4) Members of the Consultative Committee.

(5) Standard Distribution in Planning Commission.

By order, etc.

Sd/-
(K.N. Butani)
Officer on Special Duty,
Committee on Plan Projects.

ANNEXURE

COMMITTEE ON PLAN PROJECTS

Terms of Reference of the Team for the study of Chambal and Lakkavali (Bhadra) Irrigation Projects.

The Terms of Reference of the Team will be as follows:-

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to:

(a) Utilisation of trained personnel and materials;

(b) Utilisation of machinery and equipment;

(c) Construction Plant lay-out;

(d) Adequacy of original estimates and designs as evidenced from actual construction of the project;

(e) Phasing of construction with a view to studying whether

(i) timely utilisation of benefits accruing from the Project has been ensured;

(ii) it is possible to accelerate accrual of benefits;

(iii) benefits could be increased by re-phasing the project at this stage;

(f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

(g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the Project.

Memorandum from the Committee on Plan Projects to the Leader of the Team for the study of Chambal and Lakkavali (Bhadra) Irrigation Projects.

Composition and functions of the Committee on Plan Projects.

The composition and functions of the Committee on Plan Projects are described in Office Memorandum/letter No.PC(CDN)/23/56, dated 20th September, 1956 of the Planning Commission, a copy of which forms Annexure I to this Memorandum.

2. The Committee on Plan Projects consists of the following members for Irrigation and Power Sector of the Second Five Year Plan :

Chairman - Shri Govind Ballabh Pant, Union Minister for Home Affairs.

Members - Shri V.T. Krishnamachari, Deputy Chairman, Planning Commission.

Shri T.T. Krishnamachari, Union Minister for Finance.

Shri Gulzarilal Nanda, Union Minister for Planning, Labour and Employment.

Shri S.K. Patil, Union Minister for Irrigation & Power.

Dr. Srikrishna Sinha, Chief Minister, Bihar.

Shri S. Nijalingappa, Chief Minister, Mysore.

Secretary - Shri Indarjit Singh, Joint Secretary, (Economy), Union Ministry of Finance.

Terms of Reference of the Team.

3. The team will take up the study of Chambal and Bhadra (Lakkavali) Irrigation Projects. The Terms of Reference of the Teams will be as follows:

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to :

(a) Utilisation of trained personnel and materials;

(b) Utilisation of machinery and equipment;

(c) Construction Plant lay-out;

(d) Adequacy of original estimates and designs as evidenced from actual construction of the project;

(e) Phasing of construction with a view to studying whether :

....contd..2/

(i) timely utilisation of benefits accruing from the Project has been ensured;

(ii) it is possible to accelerate accrual of benefits;

(iii) benefits could be increased by rephasing the project at this stage;

(f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

(g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall, if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the Project.

4. The Leader of the Team will be assisted by a Consultative Committee of Senior Engineers, who, after necessary visits to the Projects concerned and after such preliminary enquiry as they may consider necessary, will formulate an outline of a plan for the evaluation of the Projects. The Team proper will conduct investigations in accordance with the plan laid out, subject to such discussions as the Leader of the Team may think necessary, with the Consultative Committee during the course of the investigations. The Consultative Committee will consist of the following :-

1. Shri A.N. Khosla, Vice Chancellor, Roorkee University.

2. Shri N.N. Iengar, Adviser, Ministry of Iron and Steel.

3. Shri M.S. Thirumale Iyengar, Chief Engineer, Hirakud.

4. Shri R.K. Gupta, Managing Director, National Projects Construction Corporation.

A note detailing the functions of the Consultative

....contd.. 3/

Committee is attached as Annexure II.

Nature of Study

5. (i) The practical nature of the study should be fully borne in mind. The endeavour should be to reach agreed solutions on changes in design, procedure and methods of work with the project authorities/State Governments/Central Ministries concerned.

(ii) The Team is not a Commission of Enquiry. Structured questionnaire and formal examination of witnesses may be avoided as far as practicable. The data should be gathered as a result of personal investigations by the members of the Team assisted by such staff as may be necessary.

(iii) The purpose of appointing the Team is to stimulate thinking at all levels of the working of the projects for purposes of ensuring economy and efficiency. It will perhaps be a useful procedure, in this context, to associate those engaged upon and incharge of the execution of the projects, with the actual conduct of investigation so as to give them a sense of participation in the work of the Team.

(iv) The broad procedure for the work of the Team, as laid down by the National Development Council, is contained in paragraph 6 of Annexure I to the Memorandum. The purpose of the procedure prescribed, as it will be readily appreciated, is that an endeavour should be made to reach agreement, as far as possible, on all points with State Governments/Central Ministries concerned. The report of the Team should, therefore be a brief document in four parts:

(a) Points on which agreement has been reached with the project authorities/State Governments/Central Ministries.

(b) Points on which agreement could not be reached along with a brief statement of the opposing views.

(c) Points which require further detailed examination.

(d) The financial effect of the suggestions made at (a) and (b) above.

....contd...4/

(v) In order to instil confidence in the field staff that the Team has been appointed to assist them to improve upon their existing record of work and not to criticise them, the following points may be kept in view :

(a) The Team should not give the impression that it is meant to secure super-financial control of the type usually attributed, rightly or wrongly, to the Financial and Audit Organisations of Government.

(b) It should not interfere with the sense of responsibility of those on whom the primary load for the execution of the projects or schemes rests. In fact, it should tend to re-inforce their initiative by a real helpful attitude.

(c) It should not give the impression that it is carrying out improvements. On the other hand, even at the risk of sacrificing its genuine achievements, it should make it appear that improvements stem for within the organization of the project.

6. A note by the Irrigation and Power Ministry detailing the work already done by the seminars on efficiency and economy is enclosed for the information of the team as Annexure III. The actual implementation of generally accepted suggestions in the seminars may be commented upon by the team.

Head-quarters of the Team

7. The headquarters of the Team will be at New Delhi though the Headquarters of a Member and his staff may be fixed at a different place at the discretion of the Committee on Plan Projects.

8. A copy of the note prepared for the Committee on Plan Projects detailing the background regarding the appointment of the Team and evolution of its terms of reference is enclosed as Annexure IV.

"Mehan"
14/5

Annexure I

No.PC(CDN)/23/56
GOVERNMENT OF INDIA
PLANNING COMMISSION
.....

NEW DELHI, SEPTEMBER 20, 1956.

OFFICE MEMORANDUM

Subject: National Development Council - Committee on Plan Projects.

As its seventh meeting held on the Ist and 2nd May, 1956, the National Development Council considered the question of achieving the maximum economy and effidiency in the use of financial and other resources during the Second Five Year Plan. It was emphasised that organisation, procedure and programming methods in every field should be so designed that the money spent yields the best possible results. In view of the large and growing outlay on Plan Projects, it is also necessary to explore all possible avenues of securing the economic and efficient utilisation of scarce manpower resources, materials and equipment. There is thus need for developing in organisations engaged upon the implementation of the Plan a system of internal efficiency audit.

2. The National Development Council therefore decided to constitute a Committee on Plan Projects with the following functions:

(1) to organise investigations, including inspection in the field, of important projects, both at the Centre and in the States, through specially selected teams;

(2) to initiate studies with the object of evolving suitable forms of organisation, methods, standards and techniques for achieving economy, avoiding waste and ensuring efficient execution of projects;

(3) to promote the development of suitable machinery for continuous efficiency audit in individual projects and in agencies responsible for their execution.

(4) to secure the implementation of suggestions made in reports submitted to the Committee on Plan Projects and to make the results of studies and investigations generally available; and

(5) to undertake such other tasks as the National Development Council may propose for the promotion of economy and efficiency in the execution of the Second Five Year Plan.

3. The investigations undertaken at the instance of the Committee on Plan Projects will cover all projects, industrial and non-industrial, included in the Central and State plans. For convenience of investigations, these projects have been broadly grouped under the following heads;

(1) Irrigation and Power;
(2) Public Works and buildings;
(3) Agricultural and community development;
(4) Transport and Communications;
(5) Public Industrial and Mineral Enterprises; and
(6) Social Services;

4. The Committee on Plan Projects has now been set up. It includes the Union Minister of Home Affairs as Chairman, and Deputy Chairman, Planning Commission and the Union Ministers of Planning and Finance as members. In addition, the Prime Minister, as Chairman of the National Development Council, will propose two Chief Ministers of States as members of the Committee for each class of projects referred to in paragraph 3 above. The Union Minister concerned with a project or a class of projects under investigation will also be a member of the Committee.

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5. The secretariat of the Committee on Plan Projects is located in the Planning Commission. Shri Indarjit Singh, who also holds the post of Joint Secretary in the Ministry of Finance, has been appointed Secretary of the Committee on Plan Projects. Further communications on this subject to Central Ministries and States concerned will be addressed by him.

6. The procedure to be followed by the Committee on Plan Projects was also considered briefly in the meeting of the National Development Council held in May, 1956. While the Committee on Plan Projects will itself determine its detailed procedure and lines of work according to the fields of development of projects selected for study the investigating teams will, before submitting proposals to the Committee, discuss and obtain the views of the Central and State departments and authorities in charge of projects on their draft reports. When the Committee on Plan Projects begins discussion on the proposals of an investigating team on any project, with a view to its implementation, it will arrange for discussion with the Chief Minister or Chief Ministers of States concerned with the execution of the project.

Sd/- Tarlok Singh
Joint Secretary,
Planning Commission.

To

All Central Ministries.

Annexure III

Measures taken by the I & P Ministry for laying out procedure, standards, and norms for execution of works.

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1. Plant, machinery and equipment:- Highly specialised machinery, plant and equipment are used on river valley projects. Their costs, going into crores of rupees, form a substantial part of the expenditure on the projects. A Construction Plant and Machinery Committee was set up to look into the entire question of maintenance and operation of machinery. The Committee's recommendations relating to the life of the machines, depreciation, operators, machanics, etc., have been brought to the notice of the State Governments and the project authorities for implementation.

In the past diverse types of machinery and equipment were procured for doing the same job on the same project. This made for increased maintenance costs. The Machinery Committee recommended the standardisation of the more important items. A Standing Committee of experts looked into the question and made detailed recommendations regarding the makes to be standardised. These recommendations have been sent to the Members of the Coordination Board of Ministers for notification. Only one State's reply is awaited. As soon as it is received, the standardised list will be published and recommended to the States for adoption.

Effective steps are also being taken to ensure maximum utilization of machinery and equipment that have been rendered surplus on projects nearing completion by diverting them to other projects where they are needed. In pursuance of the decision of the Coordination Board of Ministers, a 'drill' has been finalised and has been referred to the Ministry of Commerce and Consumer Industries for concurrence with reference to import licence. It is expected to be issued to the States shortly for implementation.

2. Rates and Costs :- An Expert Committee was constituted to make recommendations on a comprehensive schedule of rates which could be used as basic schedule on all projects with such modifications

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as may be necessary to suit local conditions and also on stores account rules, stores forms and cost accounting organisation. The Committee has submitted its report. The report contains valuable information which will assist engineers in the preparation of dependable estimates for projects to be undertaken in future.

Cost accounting is intimately connected with control of expenditure. Cost accounting procedure is already in force in the D.V.C. and Hirakud Dam Projects. A cost accounting cell was recently opened at Bhakra. A beginning in this direction has also been made at Nagarjunasagar. In order to coordinate costing work and to maintain, in the course of execution, a close watch on the rates of important items of work on different projects, a cost accounting cell is being set up in the Central Water and Power Commission. The recommendations of the Rates and Costs Committee in regard to a uniform set up for the cost accounting organisations will be implemented shortly.

3. National Construction Corporation:- A National Construction Corporation for the execution of river valley projects will be set up shortly. Such an organisation has definite advantages and obviates a number of problems facing projects engineers and State Governments who have to construct new projects. The Corporation can bring and keep together a permanent nucleus of administrative and technical personnel specialised in project construction. It can also maintain an efficient fleet of machinery. All these can be deployed among projects without intervention of the administrative barriers in a Governmental set up.

4. I & P Seminar & Coordination Board of Ministers:- To provide a forum for the discussion of technical and organisational problems common to the major river valley projects under execution, it was decided to hold Engineers Seminars periodically. To avoid delay in the implementation of the suggestions and recommendations made by the Seminars, a Coordination Committee of Irrigation and Power

Engineers and a paralle Coordination Board of Ministers were set up. There have been three Seminars and two meetings of the Coordination Board of Ministers so far. The more important questions on which decisions were taken by the Coordination Board of Ministers are: Report of the Plant and Machinery Committee, Standardisation of Progress Reports, Rural Electrification, Formation of a National Construction Corporation, steps to be taken to ensure achievement of construction schedules, etc.

5. Control Boards:- Control Boards have been set up at Hirakud, Kosi, Bhakra-Nangal, Koyna, Rihand, Nagarjunasagar and Chambal in order to ensure efficiency and economy and early execution of projects. The Boards are in overall charge of the projects, including their technical and financial aspects. The Boards have been functioning effectively. The Ministry have at the same time, in hand the question of assessment of work done by these Boards in order to evolve a proper set up for adoption on future multipurpose projects.

6. Technical scrutiny of schemes proposed by States for inclusion in the Second Plan:- Projects proposed by States for inclusion in the Second Plan are examined by a Technical Advisory Committee under the Chairmanship of the Dy. Minister of I & P for determining relative priority, after satisfying itself that the estimates are reasonably correct and the financial forecasts are reliable. Before ubmission to the Committee, the schemes are technically examined by the CW&PC. Such a technical scrutiny has begun to yield positive results, in improved designs and economy in expenditure.

7. The Ministry of I & P have constituted a small Departmental Committee consisting of representatives of this Ministry,

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the Finance Ministry, the Planning Commission, and the CW&PC to go into the various factors affecting efficiency and economy in the execution of projects. The Committee's Report is expected within a week.

Annexure IV

No.COPP/I&P/1/56
Dated November 29, 1956.

Item 2 of the agenda for the meeting of the COPP on December 7, 1956.

Subject : Organisation of teams for investigation of Irrigation & Power Projects.

A large number of River Projects, irrigation and multi-purpose, are included in the Second Five Year Plan. It is necessary that the Committee on Plan Projects should organise teams for investigation into them with a view to efficiency and economy.

2. Irrigation & Power Projects stand on a somewhat different footing than other projects for evaluation. There are certain common features linking all of them and the experience gained from one project can be applied, within limitations, to the other projects in that sector. Man-power, especially trained, technical and high-powered, is more fully committed in this sector to organising, planning and execution of projects than in other sectors of the Plan. We are likely to face difficulties in selecting the right types of persons for evaluation in this sector. Unless persons who can speak with authority are sent to the projects, there is more likelihood of evaluation misfiring than succeeding. On the other hand, it is also necessary that the Committee on Plan Projects should urgently organise teams for evaluation in this sector owing to the large expenditure that is being incurred and which should offer room for economy consistent with efficiency. The arrangements that have to be made in this behalf should, therefore, conserve high-powered man-power and simultaneously result in making evaluation a profitable task.

3. It is accordingly suggested that the following arrangements should be made in this sector:

(i) There should be a provision for a continuity of personnel for the purposes of evaluation in these Projects. It is not necessary that we should have only one team doing this work

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but that some fixed element should be retained in the Committee on Plan Projects which should be practically a part of every team organised for Irrigation & Power Projects.

(ii) Arrangements should exist for consultation with the highest possible level of technical experience and talent available in the country without making a significant demand on scarce man-power resources. Ultimately demands of this character are met by transfer of personnel from one useful activity to another and this is precisely what should not be done.

4. Fortunately in this sector a good deal of work has been done under the directions of the Ministry of Irrigation & Power in laying out procedures, standards and norms for execution of work which will be of considerable utility to the teams organised for purposes of evaluation. One of the tasks of such a team would be to see that these procedures etc., which have been evolved after a considerable discussion among technical officers from all over India, are effieiciently observed in actual effect in the projects concerned.

5. The arrangements necessary for evaluation in the light of the discussion above, are discussed in succeeding paragraphs. The discussion is both in respect of general questions and concrete proposals necessary to implement them.

(i) A Consultative Committee should be constituted of four to five top Engineers in the country. The functions of this Committee should be to make a number of short spot studies of the project and to lay down a broad directive indicating the methods that should be followed in conducting evaluation of projects. It should advise the team on important issues that arise during the course of examination and which are referred to the Consultative Committee by the Leader of the team. It should study the draft report submitted by the team and offer comments. The team should be invited to participate in the discussion on the report by the Committee on Plan Projects.

(ii) One of the membersof the Consultative Committee should be included in the teams organised for this purpose.

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(iii) The composition of the Consultative Committee should be as follows:

(1) Shri A.N. Khosla, at present Vice-Chancellor of the Roorkee University.

(2) Shri N.N.Iyengar, at present with Tatas but it is understood that he will be available from the middle of December.

(3) Shri Thirumale Iyengar, at present Chief Engineer, Hirakud.

(4) Shri R.K.Gupta, retired Chief Engineer (Irrigation) Punjab, O.S.D. National Construction Corporation.

(iv) Shri N.N.Iyengar should be both on the Consultative Committee and be a member of the team. One of the junior members of the team could be designated as the convener of the Consultative Committee.

(v) Immediately two projects should be selected for evaluation. One of them should be working under a Control Board. The suggestion is that the two Projects may be Chambal and Lakkavali (Bhadra).

Bhadra Project (Lakkavali Project).

1. Bhadra Project is an irrigation cum hydro-electric project. The project is being executed by the Mysore Government. The project as originally conceived was estimated to cost Rs. 888.48 lakhs. Due to general rise in the cost of materials and labour and chages in the scope of the project, the estimate had to be revised. The revised estimate as now sanctioned is for Rs. 17.75 crores. Since this estimate was sanctioned, further changes have been made in the design of the dam and the comprehensive cost of the scheme is now estimated at Rs. 24.42 crores.

2. The scheme as now contemplated consists of

(a) a masonry dam, 194 ft. high with a storage capacity of 71,500 million cubic feet.

(b) A power house at the dam with an installed capacity of 41,040 KW.

(c) Canals on both sides of the river, the length of the right canal being about 58 miles and that of the left canal 50 miles.

The project will irrigate an area of 2,34,200 acres and is capable of producing 25,000 KW of firm power at 60 per cent load factor.

The project is expected to be completed in 1961.

The project will yield a return of 5%.

3. The preliminary works on the project were started in 1947, but for want of adequate funds construction was continued on a 'go slow programme'. In 1953, assistance was given by the Central Government by way of loans for the construction of the project and since then, construction work has been accelerated.

The progress on the important works on the project to end of June 1956 was as follows:-

Dam

(i) The progress on the excavation for foundation was 89.5% of the total estimated quantity of 165 lakh c.ft. The target date of completion of this work is June 1957.

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(ii) The work on the masonry for dam has been done to an extent of 51% against a target of 53%. The total estimated quantity is 231.9 lakh c.ft. The target date of completion of this work is June 1961.

Left Bank Canal

98.5% of the excavation of the left bank canal has been done out of an estimated quantity of 377.3 lakh c.ft.

Right Bank Canal

In the first section of this canal of length 47½ miles involving earth-work excavation of 3894 lakh c.ft., 61% of the work has been done against a target of 51%. Further work is in progress. Work on the power portion of the project is yet to be started. It is expected to be completed in 1961.

It is therefore seen that the work is progressing satisfactorily and is likely to be completed by the target date of 1961. The expenditure to end of June '56 was Rs.6.74 crores. It is proposed to irrigate an area of 10,000 acres in 1956-57.

4. No special difficulty in the execution of the project has been brought to the notice so far.

5. The project is under the charge of a Special Chief Engineer. In addition to this project, he is incharge of other major projects in the State, viz. Nugu, Tunga, Ambigola and Tungabhadra.

CHAMBAL PROJECT

1. The Chambal Project is a Hydro-electric and Irrigation Scheme. It is being executed jointly by the Madhya Pradesh (formerly Madhya Bharat) and Rajasthan States. The Scheme envisages the construction of three Dams with a Power House at each and a barrage across the river Chambal near Kotah with canals on both sides for irrigation in both the States. The Project will ultimately produce 2,10,000 K.W. of power at 60 per cent load factor and irrigate 14 lakh acres of land at an estimated cost of Rs. 72 crores.

2. The execution of the Scheme has been planned in three stages.

The First Stage estimated to cost about Rs.48 crores has been sanctioned. It consists of:-

(a) Gandhi Sagar Dam at the border of the Madhya Pradesh and Rajasthan States. The Dam will be 204 ft. high and 1685 ft. long at the top and will create a storage of 6.85 million acre ft.

(b) A Power House at the Gandhi Sagar Dam to accommdate five units of 23,000 K.W. each, three units being installed in the First Stage.

(c) Transmission lines aggregating to about 772 miles in Madhya Pradesh and Rajasthan.

(d) Kotah Barrage.

(e) Canals on both sides of the river-162 miles in Rajasthan and 390 miles in Madhya Pradesh.

3. The first stage of the Scheme is scheduled to be completed in all respects in 1962. It will generate 75,000 K.W. of power and irrigate 11 lakh acres of land and yield a net return of 4 percent.

The installation of the fourth generating unit at the Gandhi Sagar Power Station and increasing the lenth of transmission lines from 772 to 911 miles has also recently been sanctioned as approved by the Planning

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Commission, which will increase power generation in production.

4. The Project is being financed by the participating States of Rajasthan and Madhya Pradesh from loans advanced by the Government of India. The two States are executing the works lying in their respective territories. The work of the Gandhi Sagar Dam which is at the border is being executed by the Madhya Pradesh State. In Madhya Pradesh the works consting Rs.31.43 crores are in charge of a special Chief Engineer appointed for the purpose. In Rajasthan, the works costing Rs.16.60 crores are being carried out by the Chief Engineer, Irrigation, Rajasthan in additon to his normal duties.

5. To ensure efficient, economical and early execution of the Project, a Control Board was set up in April, 1955, under the Chairmanship of the Deputy Minister, Irrigation & Power, Government of India. The two Ministers from the participating States in charge of Chambal Project are Members of the Board. Joint Secretary, Finance Government of India and Chairman, Central Water & Power Commission are the other Members from the Centre. The two Chief Engineers in charge of the works are also Members.

The Board is not a statutory body, but by convention its decisions are implemented by the two State Governments and formal orders are issued by them on receipt of draft orders from the Boards Secretariat. Both the Chief Engineers, though administratively under the respective state Governments, are executing the work under the general directive of the Board.

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The up to-date progress on the main works comprising the first stage of the Scheme to end of November , 1956 is as under:-

MADHYA PRADESH PORTION OF THE SCHEME.

(a) Gandhi Sagar Dam.

i) The excavation of foundation is nearing completion; 85% of the total work has been done.

ii) The work of stone masonry and concreting in the body of the Dam has been done to the extent of 74 .7% of the target or 28. % of the total 256 lakhs cft. The short fall is expected to be made up shortly with the aid of construction machinery which has only recently been installed.

iii) The Crest gates and other necessary equipment for the Dam is on order in Germany where manufacture is well in hand. The Dam is scheduled to be completed by June, 1959. Side by side the work of rehabilitation of the 31,000 persons to be displaced from the reservoir area is in progress.

(b) Power House at Gandhi Sagar Dam.

The Civil works in connection with the Power House are in hand. Orders have been placed abroad for the Penstocks, Generating plant and other equipment required. Orders for Penstock gates are being placed shortly. The Power House is also expected to be ready with the completion of the Dam.

(c) Transmission Lines.

The work of surveys of Transmission Lines is almost complete. Orders for Transmisson.

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Towers, conductors and Insulators require for the Madhya Pradesh Portion of the transmission lines are about to be placed by the D.G.S.& D. Details of sub-stations and their equipment are being finalised in consultation with the Central Water and Power Commission.

RAJASTHAN PORTION OF THE SCHEME.

(d) Kota Barrage.

i) 41.55 lakhs cft. of rock cutting has been done, which is 71.6% of the target to date or 59.3% of the total of 70.0 lakhs cft. to be done.

ii) Progress on masonry and concreting is 71.3% of the target to date or 53.1% of the total of 27.0 lakhs cft. to be done.

iii) Sheet piling is in progress for the earthen portion of the Barrage.

iv) Orders have been placed with Tungabhadra Workshop for the barrage gates.

Progress on Barrage is expected to be accelrated with the arrival of more construction machinery recently sanctioned by the Chambal Control Board. The barrage work is expected to be completed in March, 1959; but efforts are being made to finish it earlier, if possible.

(e) Canals both in Rajasthan and Madhya Pradesh portions of the Project.

i) So far , 58% and 15.8% of rock cutting has been done on canals in the Rajasthan and Madhya Pradesh portions respectively. The progress is behind schedule by 19% and 70%

ii) Earth work on canals has been done up to 25.9% and 6.3% of the total in the Rajasthan and Madhya Pradesh portions respectively. The progress is behind schedule by 36% and 44%.

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Summarizing, the important points for notice are:-

1. To ensure the timely supply of controlled materials to the Project.

2. The required foreign exchange for purposes of import is released in full.

3. To see if procedural delays can be minimised at the two State levels.

4. To effect better co-ordination between the execution agencies.

5. To see if terms and conditions of service can be improved, where necessary, to attract suitably qualified personnel.

Note on enquiries to be made by the Committee on Plan Projects.

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Chambal Project (Gandhi Sagar Dam).

Planning.

1. Examination of the general plan of the project and study of any methods by which it would be possible to plan it more economically either by dropping some features or by stage construction.

2. What is the type of co-operation between the State Governments? Was there any delay on account of lack of co-operation between the 2 Governments? How can these inter-state projects be proceeded with more quickly at various phases?

3. At the Planning stage were the people affected by the project taken into confidence and the project discussed with them? The extent of public co-operation that could have been mobilized before the project started may be examined so that in future projects public enthusiasm is chanelled.

Investigations.

1. Were the investigations of the project done in proper time and in sufficient details, if not as in the case of Gandhi Sagar Dam first site? What were the circumstances to compel starting of the construction without proper investigations specially of the foundation? Can these circumstances be avoided in future?

2. Did the investigations include comprehensive examination of the materials to be used at the project and flow sheet for the feeding of these materials drawn up? One of the economical methods of construction is to ensure smoothness by regulated flow of materials of construction. To what extent was this achieved in this project in the beginning and now?

3. What is the machinery that can be employed to reduce the time involved in taking surveys of the canals area. Generally investigations for the dam can be finalised within two years if not earlier. But very often the canal system requires extensive surveys. How can this work be done expeditiously? Many times projects are started without these surveys as in the case of Chambal and this effects both the construction as also costs.

Designs and quality control.

1. Were the designs of the various items in the project done well in time or all the vital designs got as the work proceeds? To what extent complete preparation of the designs before would have speeded up the construction and also have avoided other mistakes? What is the type of organisation for the designs and cost spent on the designs? What steps are being taken to train up some engineers specially for designs work?

2. What are the steps taken to ensure execution of work as per specifications? What is the type of Quality control organisation? The quality control organisation must be equipped for ensuring correct work in masonry in concrete and the earth work. Is the present system simpler than the one adopted at D.V.C.?

Construction.

1. Has the construction plant lay-out been drawn in advance and machinery purchased according to this drawn up list of machinery purchased without a plan? Are the construction programme schedules drawn well before hand and comparison made from time time? How does the actual execution follow the programme?

2. What are the bottlenecks at different times? State the agency which is responsible for this like the Railway, transport, D.G.S.D. What are the methods by which the bottlenecks can be overcome? What is tye type of relation-

ship established between the Central Organisations and the Project authorities to get this aim of overcoming these difficulties. What was the time programme for foundations and what is the actual time taken? Is it a fact that more time is lost in foundation work due to want of plan procedures?

3. What is the staff employed? How many hours do they work? How is second shift system arranged?

4. What is the colony construction like? Is it on the minimum standard or extravagant?

5. What is the number of accidents? Were preventive measures taken? What are the safety measures taken?

6. How was the co-operation built up between workers and the project authorities?

Development.

1. How are the development plans drawn up? Have the areas to be irrigated localised. Are the power utilisation properly and economically planned? Has any extra factor effected the economy by transfer of irrigation benefits to different other more economic areas and likewise of utilising the power?

2. Where are the types of rehabilitation measures adopted? Was this aspect discussed with people effected?

3. What are the criticisms against the project in different times and how are they met with?

Direction.

1. Have the technical, administrative and financial sections defined lines of work? Is there satisfactory co-ordination between them? If not, how this can be remedied.

2. Has the Committee any opinion to express about the personnel of the Control Board?

3. Is it understood that considerable delays occur in implementing the resolutions of the Board due to the State Governments concerned taking their own time in passing orders on the resolution, or in authorising the Chief Engineer to

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implement the resolution. The Committee may suggest ways and means of overcoming these delays.

Power.

1. In the execution of the project (power portion), is necessary action being taken by the Engineers to execute the various sections of the project to be able to utilise the power to be made available by the establishment of the generating station, without undue loss of time between generation and distribution?

2. Is the project designed and executed to secure to optimum exploitation of the power potential of the site?

3. Whether necessary action has been taken to secure the required technical personnel to execute the different sections of the project, as and when required, to complete the entire project as per schedule and whether the schedule drawn up is realistic.

Lakkavali Project.

1. Is it a fact that this project was investigated very thoroughly for many years but has been taken up recently? What are the measurs by which such projects which have been investigated in detail are brought up to the notice of the Central Government?

2. What are the main objects of the project?

3. Is the cost commensurate with the benefits? What are the factors for increased cost per KW or per acre of irrigation? Is it due to the topographical conditions?

4. What are the steps by which a comparable basis be established by which projects like Lakkavali can be compared with other projects?

5. The cost of the staff and labour is much less than in other Projects. Still the estimated cost for one acre irrigated is larger than in some other projects. This

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Paragraph No. (1)	Recommendations made in the Lakkavali Project (2)	Comments of Mysore Government. (3)
1.Scope of Project:		
1.2(i)	It is suggested to negotiate with tenderers for supply of electrical machinery, to provide for overload capacities upto 6000 K.W.so as to enable utilising the waters for generating more electricity during the initial stages of irrigation when full demand for irrigation would not have been developed.	Accepted.
1.2(ii)	There is a need to replace the old Madras-Hyderabad-Mysore agreement by a new Andhra-Mysore agreement, with a proviso to allow Mysore to keep a carry-over to be utilised in lean years, which would increase generation of firm electricity every year without detriment to the interests of Andhra, in addition to warding off shortages in lean years.	Accepted.
2.Administra--tion.		
2.6(i)	It is recommended to create an additional Circle under a separate Superintending Engineer, charged with the execution of the Hiremalali Tunnel and all the canal works lower down the Tunnel, with a view to completing the project in time.	Accepted.

(1)	(2)	(3)
2.6(ii)	It is recommended to create a Central Designs Organisation, directly under the Chief Engineer, Major Irrigation Projects, with its branch offices located at the Superintending Engineer's headquarters, to keep a laiason between the field officers and the Central Cell. The exact staff etc. required for this Organisation is to be worked out by the State authorities.	Accepted.
2.6(iii)	With a view to making available the services of the Research Station at Krishna Raj Sagar to the projects, promptly, the Research Officer may carry out research for the Project under guidance of and report direct to Chief Engineer, Major Irrigation instead of through Chief Engineer (General), as, then the Research Officer can promptly carry out his responsibilities, after establishing direct contacts with the field Engineers.	Accepted.
2.6(iv)	Strengthening of field laboratory on the Project and appointing a special senior Executive Engineer in charge of quality control and laboratory to be responsible to Chief Engineer, direct is recommended.	Accepted.

(1)	(2)	(3)
2.6(v)	Training of Storekeepers in a proper way, with or without the help of outside agencies like Commerce Colleges, with a view to keep the store accounts in a trim order is recommended.	Accepted.
3. Phasing of construc--tion progra--mme.		
3.3	Partially raising the dam to level 106' instead of 98' by June 1958, as already planned is suggested so as to achieve irrigation of about 50,500 acres during 1958-59 on Right Bank Canal.	Accepted.
3.5	It is urged that the tunnel should be completed in 2 years time i.e. by June 1959, and the rest of the canal by June 1961.	Accepted.
4. Features of Design and construction.		
4.2	Providing Field Control Laboratory (Soil Mechanics) for the earth dams is suggested.	Accepted.
4.3	It is recommended to install instruments measuring deflection, temperatures, uplifts & stresses of Masonry Dam & consolidation, settlement and porepressures of earth dams.	Accepted.

(1)	(2)	(3)
4.6	It is proposed to standardise the ingredients of and technique of preparing Lime Surkhi Mortar with a view to minimising the variation in the strength of mortar as now noticed. It is already suggested before to have a quality control Organisation.	Accepted.
4.7	In general, the earth moving machinery is not utilised to their full life and they need to be employed on more gainful works, with greater efficiency.	Accepted.
4.8	It is proposed to discontinue the practice of subclassifying soil, murum, soft rock and rock which has proved impracticable and unnecessary and which might lead to disputes and abuse.	Accepted.
5.Canal Works.		
5.2	Alternative scheme of machinery for the Tunnel is suggested by the team, which would result in a saving of Rs. 10 lakhs on the projected outlay on Machinery for this purpose.	Accepted.
5.3	The team has suggested as per appendix 8 to take the Davangere Branch of the channel from over the Shantisagar Bund,in an R.C.C.trough, a proposal which would be cheaper than the rest of the alternatives by 20 to 54 lakhs.	Accepted.

(1)	(3)	(3)
6. Development of Irrigation.		
6.11	There is a scope for upward revision of water rates, comparing the rates in Mysore with those in Bombay etc.	Accepted.
6.13	Adoption of Bombay's pattern of Irrigation Administration and Management, wherein the Irrigation Development controls the management, which includes regulation of canals, preparing irrigation programmes annually, checking unauthorised irrigation, waterlogging and salt efflorescence, providing drainage schemes, preparing assessment papers and fixing up crop patterns etc. etc.	Accepted.
6.14	Block system should be enforced to avoid hap-hazard development of irrigation as has happened in the case of Irwin Canal.	Accepted.
7. Generation of Electricity.		
7.5	In order to accept a firm additional load of 25,000 K.W. at the load factor of the system, it would be necessary to carry over waters from surplus years to lean years.	Accepted.

(1)	(2)	(3)
7.6	Overload capacity should be provided for and negotiations should be carried out with suppliers of machines to this effect so as to enable generation of more power.	Accepted.
7.7	The monsoon inflow in the reservoir should be so regulated as to have the reservoir full (186') by 1st October and depeted to lowest level by June next. In case the Monsoon is found too weak to fill the tank, the discharges at riverbed should be suitably reduced, so as to obtain a level of reservoir as near to 186' as possible at the end of monsoon.	Accepted.
8. Construc--tion costs.		
8.7	Steel is being used on canal (acqueducts) and there may be scope for saving~~t~~ the same (by replacing R.C.C.by masonry and plain concrete arches.)	Accepted.

Telephone No. 4361

M. NARASIMHAIYA, M.I.E. (IND)
CHIEF ENGINEER FOR IRRIGATION (RETD.)
MYSORE

BRINDAVAN
RANGARAO ROAD, SHANKARAPURAM,
BANGALORE 4

83. Kotla House
New Delhi
20.11.57

Dear Shri Shrinivasa Char,

I enclose a Copy of the Comments made by Shri T. Ramasway Iyengar when he was Chief Engineer Major Irrigation. Similar comments on certain points made in our Report (Draft) on Lakkavalli Project.

I had left a Copy with Shri Srikanty. This is for your easy reference.

In high hopes

Yours sincerely

M. Narasimhaiya

MYSORE GOVERNMENT SECRETARIAT
NO. 8084
25 NOV 1957
PUBLIC WORKS MAJOR IRRIGATION BRANCH

22/11/57

23/11/57

put in the usual file

Draft Report on the Lokkavalli Project

(A) Para 2 (4)

Suggestion for considering the maximum over-load capacity for the two River Bed generating units during final negotiations with the successful tenderer.

(B) Para 3 (11)

Examination of the question regarding the final sharing of the Tungabhadra Waters and joint regulation of Bhadra Reservoir and Tunga Bhadra Reservoir to obtain if possible the optimum benefits for the Mysore State.

The Chief Engineer agrees that these two questions need urgent attention.

(C) Para 4(4) & 4(13)

Consideration of making the Standing Technical Advisory Committee compact.

Proposal of the payment of reasonable remuneration to the Members of the Committee.

The Chief Engineer feels that the S.T.A.C. can be more compact similar to the Inter-State Tech. Committee and that a monthly suitable retainer is considered necessary.

(D) Para 5(3)

Necessity for the formation of an additional circle for supervision of the tunnel works and construction of the [illegible] etc. beyond the tunnel.

The Chief Engineer has submitted a recommendation to Govt. in this behalf.

(C)1	Para 5(6) Procedure of preparation of designs.	The practice is that the Chief Engineer even now issues basic design instructions to the Ex. Engrs. and he agrees to the proposal of a design cell.
(D)2	Para 5(7) Procedure of obtaining the results of model experiments at the Brichhareja Research Station for the major projects such as Mahanadi, to be made expeditious.	Chief Engineer (General) agrees and suggests corrections (vide corrections in 5.7).
(E)3	Para 5(8) (a) Proposal for a laboratory.	A new laboratory Building has been constructed and action has been taken to post personnel, equip the laboratory for mortar and concrete tests as also for soil tests on the field.
(F)4	Para 5(8)(b) Proposal for quality control Executive Engr.	Chief Engineer agrees with the proposal for a quality control Executive Engineer.
(F)	Para 5(11) Appointment of an experienced store keeper at the dam site.	Chief Engr. proposes that a training centre for training Store Keepers is an immediate necessity choosing First Dn. Clerks with a suitable allowance.

(G)	Para 5(14) Delegation of increased powers to the Chief Engr. & other officers.	Chief Engineer is of the opinion that this is an urgent necessity.
(H)	Para 6(3) Proposal for obtaining sufficient level in the spillway section so as to allow water in the Right Bank sluice for the Right Bank Canal one year earlier than the schedule.	The Chief Engineer has programmed to do this by June 1958.
(I)	Para 6(5) an. 6(6) The programme of construction of tunnel and the canals so as to complete them in all respects by 1960-61.	The Chief Engineer has made all arrangements to see that if funds are made available the project gets completed by 1960-61 virtually.
	Approximate extent of funds required during the years 1957/58, 1958/59, 1959/60 and 1960/61.	3 crores 4 Crores each year. The revised Estimate of works under the jurisdiction of Chief Engr. amounts to Rs. 24 crores. (app.)
(J)	Para 7(8) Standardisation of Surkhi and Mortar.	Chief Engineer agrees.

(Q)	Para 7(21) Suggestion to reduce the number of soil classifications on canal excavation.	Chief Engineer says that this is being examined with a view to reduce the number of classifications.
(R)	Para 8(1) & 8(2) Equipment required for tunnel.	Full equipment as under 8.1 is not required all at once. This scheme will be kept in view and every effort made to secure economies.
(S)	Para 7(4) Alternative alignment to cross Sulekere tank.	Chief Engineer has no fresh remarks to offer.
(T)	Para 9(12),9(13), 9(14) and 9(15) Proposal for entrusting irrigation management to the Irrigation Department and a suggestion to introduce this under Left Bank Channel where water has already been allowed.	Chief Engineer agrees with this proposal.

(Sd) T. Ramaswamy Iyengar
Chief Engineer,
Major Irrigation - South,
BANGALORE.
20/8/57.

NOTES ON CONSTRUCTION PLANT
HIRSHALALI TUNNEL

The total length of the tunnel is 13,600 ft.

Four mine shafts are being presently driven at site to provide more headings. From each shaft two headings will be driven, and the operations will be so phased that with a single set of equipment the work can proceed uninterruptedly on both faces. Compressor and blowers will be installed at mine-head and pipe lines run down the shaft to both faces. While at one face drilling and blasting operations will be in hand, mucking equipment such as M.G. Waggons, mine loader and mine head hoists will be working against the other face. After every four hours or so the two operations are switched over, thus providing continuous operation. For efficient working, about 1000' is considered to be the maximum shaft, otherwise it would be increasingly difficult to be able to switch over operations and delays will result.

Although four shafts are being sunk, it would suffice to obtain equipment for working only two mine heads at a time. Air Compressor and blower stations will be provided at the end headings and also with the mine headers at the shafts which are being worked.

The plant and equipment necessary for these operations has been figured on the basis of 2 shifts working although there is no reason why the work should not go on round the clock. Similarly 300 working days have been assumed in one year whereas it may be possible to continue the work throughout the year by staggering labour. Anyway there are the possibilities which can further improve the time schedule but no scaling down of construction plant on these accounts is contemplated.

It is understood that some of the rocks are water-bearing. It is recommended that one drill hole should be carried to about 20-30 ft. ahead to tap such water bearing seams and promptly seal them by pumping grout into them under pressure through the drill hole.

The total period of construction has been taken to be 1½ years, 300 days for excavation and 350 for lining, with an over-lap of 200 days. The lining operations are proposed to be started as soon as work from a shaft has been completed. This should be after about 100 days of the beginning of operations. ($\frac{1000'}{10'/day}$ = 100 days).

The total cost of equipment as per this programme works out to about Rs. 28.70 lakhs against Rs. 30.04 lakhs as provided, basing the costs on existing project figures.

Abstract of costs:

1.	Pneumatic equipment	3,60,000
2.	Hoisting equipment	86,500
3.	Drilling equipment	4,44,400
4.	Pumps	2,10,000
5.	Colony W.S.	16,000
6.	Electrical equipment	6,83,500
7.	Miscellaneous - T & P	3,[illegible],140
8.	Workshops	23,500
9.	Telephone equipment	30,000
		25,03,040
	Add 10% for spares	2,50,304
		28,60,244
	Say	28.60 lakhs.

Items 4(b), 5, 8 and 9 have not been reduced although there appear to be some scope for economising in item 5 Electrical equipment.

PROCEEDINGS OF THE GOVERNMENT OF MYSORE

Read:-

Government Order No.PWD 14 BRP 57 dated 17.4.1957 directing that the alignment ACD from the exit (point A) of the tunnel as indicated in the index plan should be adopted and the work on this portion may be taken up for execution pending final decision on the alignment of the channel to cross the 'Shantisagar Valley' from the point 'D' onwards.

ORDER NO.PWD 14 BRP 57,

BANGALORE, DATED 22nd JULY 1957.

After two spot inspections by the members of the Standing Technical Advisory Committee, the question of deciding the alignment of the Bhadra Reservoir Right Bank Channel to cross the Shantisagar Valley from the point 'D' came up for discussion at the thirty third meeting of the S.T.A.C. held on 10.7.1957. The relative merits and demerits of the four main alternatives A, B, C and D in the margin were discussed. The first and the last alternatives were proposed to be dropped and it was agreed that the

1. taking both Davangere and Malebennur channels in contour above the water spread of the Shantisagar tank.
2. to run the main canal up to the village on the left side of the Shantisagar Tank and then from there bifurcating into Malebennur and Davangere and taking Davangere channel behind Shantisagar tank by means of an aqueduct or syphon.
3. to take the Davangere Branch channel in a flume over the bund of Shantisagar Tank.
4. keeping Bhadra Reservoir Right Bank main canal into Shantisagar tank and drawing off those from the Malebennur and the Davangere branches.

the second and third alternatives may be considered after some further investigations are conducted. However as the point D 1 in the main channel is common to the remaining alternatives, the Committee were of the unanimous opinion that the work of the main channel upto the point D 1 and the Malebennur channel from the point D 1 may be proceeded with pending final decision on the alignment of the Davangere Branch.

Government approve of the recommendations of the Standing Technical Advisory Committee referred to above and direct that the work of the main channel from 'D' to D 1 and the Malebennur Branch channel beyond the point D 1, as shown in the plan (attached to the G.O. read in the preamble) be continued in the contour with reference to the level realised at the tunnel exit.

By Order,

Sd/-
(M.B. Murareppa)
for Secretary to Government,
Public Works Department.

To,

The Chief Engineer, Major Irrigation (South), Bangalore.
The Superintending Engineer, Tungabhadra Valley Circle,
The Executive Engineer, Tungabhadra Project Post, Via Dharwar.
Copy to the Secretary S.T.A.C. for information.

NOTE OF OBSERVATIONS AND SUGGESTIONS MADE BY THE PLANNING COMMISSION TEAM, WHO VISITED THE BHADRA RESERVOIR PROJECT RECENTLY.

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SCOPE:

(1) During good years surplus water is available. Besides, in the initial year, irrigation will not have developed fully and good proportion of the water earmarked for irrigation can be utilised for generation of additional energy by discharging the surplus into the river bed, thus obtaining greater head - for power generation. Also an additional peaking capacity could have been achieved by providing a third pen-stock outlet for installation of the third 12,000 K.W. unit. This is not possible now as the dam has been built well above the Pen-stock level. It is, however, suggested that during the final negotiation with the successful tenderer maximum overload capacity for the two river bed generating units be called for and incorporated in the final designs of the units.

Experience shows that demand for power is mounting up, and is outstripping load forecast and generating capacities. In view of additional supplies becoming available for power production in the initial years when full irrigation is not developed, the desirability of making due provisions in the Civil Structures for such utilis-ation needs to be examined at the design and construction stage.

AGREEMENT REGARDING UTILISATION OF BHADRA WATERS.

Territorial changes consequent on the Re-organisation of States in 1956, have resulted in the disappearance of the Hyderabad State, the territory in the old Hyderabad State affected by the Project having been added partly to the enlarged Andhra State and partly to the Mysore State. In view of these changes the existing agreement need to be reviewed as early as possible and it is suggested that the Government of

Mysore, who are the major beneficiary in the project should take initiative in the matter, in view of the large interest involved.

The Examination of the Lakkavalli Reservoir Working Tables for releases for irrigation and Power Show that in order to make the fullest use of the water resources and to obtain the designed output, it is essential that the Reservoir should maintain carry-over in good years. According to Clause 2 of the existing agreement between the Mysore and Madras Govt., any quantity of water impounded in the reservoir for purposes of generation of power only, is required to be released into the river undiminished, within the same year. The clause thus prevents Mysore from maintaining a carry-over. It appears that a carry-over in the Lakkavalli storage would not only benefit Mysore, but also the projects downstream, since additional water from Lakkavalli will be released in bad years for urilisation.

It may be stated that the design of the Lakkavalli Dam permits such a carry over to be maintained and this space will be left unutilised, if carry over is not permitted.

Since Mysore State have a large share in the Tungabhadra Reservoir Water, it may now be feasible to revise an inter-related regulation for both the Lakkavalli and T.B.Reservoir. It is suggested that Mysore State should take the earliest opportunity to examine this question and get it solved to the mutual satisfication of the concerned States. The guiding principle should be an integrated development of the River Valley, treated as a unit.

ADMINISTRATION.

The existence of Standing Technical Advisory Committee in the State with a view to make use of the high technical talent and vast experience of retired Chief Engineers, in the execution

of Projects was highly appreciated by the Team. It was suggested that the S.T.A.C. may be made more compact, as the Sharavathi Valley Hydro Electric Project Committee.

It is considered that the payment of reasonable remuneration is essential for members of the S.T.A.C. They have to spend their valuable time in the proper study of the intricate technical problems of urgent nature on which effective progress is necessary in the interest of the Project.

ORGANISATION:

(1) The tempo of the progress on the Lakkavalli Project needs to be intensified immediately. The large and important work of the 2,3/4th mile long tunnel on the Right Bank Channel, and the excavation of the Malebennur and Dhavangere Branches are to be started immediately and proceeded with at a rapid pase so as to syncronise with the completion of the Lakkavally Dam.

These works will need considerable personal attention of the Superintending Engineer. It is absolutely necessary that a second post of Superintending Engineer should be created without loss of time to take charge of the construction of the channel tunnel and the Malebennur and Dhavangere Branches. It is therefore very desirable in the interest of the timely completion of this work which has already been delayed - that the Head Quarters of the Second Superintending Engineer should be fixed within an easy reach of the Tunnel.

(2) Though complete designs had been made, when the original project was prepared, these designs had to be modified from time to time to suit the changed scope of the Project. The prevailing practice is to get the modified or new designs prepared in the Office of the Executive Engineer concerned. This practice needs a change. The centralised designs cell

attached to the Chief Engineer's office would be much more efficient and will conduce to saving of time and technical manpower and standardisation of designs. This cell must have a close liasion with the field work.

(3) Sanction to Estimate pertaining to Model Studies should be accorded by the Project Engineers and not by Chief Engineer (General).

(4) The research officers should maintain close contact with the project engineers, should visit the site of work, if necessary, and communicate the results of the tests to the Project authorities direct under intimation to the Chief Engineer (General), who is the controlling officer for the Station. At present, the laboratory facilities for field research works and tests on this project are inadequate. Both in the interest of the project itself and as a contribution towards a general advancement of scientific knowledge and technique it is necessary to expand the laboratory organisation in the fields of building materials particularly, mortars, concrete and soil mechanics. The quality of works and strict observance of specifications have to be continuously watched and ensured. A distinct organisation headed by an experienced senior Executive Engineer directly under the control of the Chief Engineer needs therefore to be maintained.

The team stressed the necessity for having experienced store-keepers for this project. When the work on the construction of the tunnel is undertaken, an adequate organisation for maintanance of Stores will be required.

(5) Powers of the P.W.D. Officers under the old Mysore State were considerably smaller than those enjoyed by the officers of equvalent rank in the Major Provinces. In the interest of expeditious and efficient execution of the projects, it is essential that the said powers as are enjoyed by officers of other States e.g., (P.W.D. Bombay), should be delegated to the Officers

of Mysore particularly in view of the considerably increased magnitude and responsibilities of the development works consequent to the integration.

PHASING PROGRAMME:

The team felt that the phasing of the construction programme can be improved so as to obtain additional irrigation benefits one year earlier. The dam is to be raised to about plus 106 with a smaller but stable cross-section. The work in Section I of the R.B.C. together with the Anvery Branch are to be completed simultaneously. With the implementation of these suggestions, irrigation facilities to an area of 50,500 acres will become available, one year earlier without any extra cost.

The actual construction of the tunnel should not take more than 2 years (including six months for procurement of machinery). Hence if energetic steps are taken from now, the tunnel should be ready by mid-1959. By this time a major portion of the Malebennur Branch and some portion of the Davangere Branch should be completed. The canal work should be completed in all respects by 1960-61, which is also the year when the Dam will be completed and full storage made available. In view of the fact that there are definite prospectus on this project for the commencement of irrigation and Power benefits without a timelag, the full quota of funds for the completion of the balance of the job needs to be made available.

FEATURES OF DESIGNS AND CONSTRUCTION.

(1) Both in the case of the masonry Dams and the Earth Dams it is desirable to instal instruments in the Dams for collecting Data on the behaviour of the Dams. In the case of the Masonry Dams the information sought would be on temperature, deflection uplifts and stresses and in the case of the earth Dam for consolidation settlement and pore pressures. Such instruments could be installed at small cost and the observations could be taken by the maintenance staff.

(2) Before commencing construction on the Lakkavalli Dam, tests were carried out on samples from certain lime kankar deposits and soils for manufacture of surki. Mortar tests were also performed. There is no laboratory control on the new materials used for the manufacture of lime and surki during the stage of construction. Results of tests of the mortar cubes performed, continuously show a wide variation of strength. If lime kankar and soils used in the manufacture of mortar are subject to test, it would be possible to standardise the products and reduce the variations of the mortar strengths to narrow limits. Such standardisation will lead to the adoption of higher permissible stresses in the masonry and permit adoption of more economical cross-sections of Dams. This suggestion could be considered for future Dams.

(3) Laboratory facilities should be provided at Lakkavalli to conduct research work on lime-surki sand mortars. Such work is bound to pay dividends.

(4) Heavy stones 5 ft. in depth are being used for the downstream face of the spillway. These are tied down with steel bars and set in cement concrete. It will be safe to replace the construction by use of smaller stones without any steel bars. This will give some savings.

(5) The estimate provides for addition of 5-10% cement to the lime surki mortar used for rubble masonry in the spillway section of the dam. In actual construction this is not done and correctly so. The resulting saving for the whole work would have been Rs.2,00,000/-.

(6) In respect of Canal structures it is advisable to adopt masonry structures whenever possible to save cement and steel, particularly in view of the fact that skilled artisans for masonry works are readily available locally.

(7) The concrete in the stilling basin is being treated with vaccume pads. A word of caution is necessary in regard to the adoption of this treatment. Apart from the specialised nature of this work, the advantages claimed are somewhat doubtful. This treatment was adopted on the construction of the Shaste Dam in the United States of America, but on dams built subsequently this treatment has not found favour.

(8). A few pieces of heavy earth-moving machines viz., tractors, shovels, and end-dumpers are used on the Dam construction The dumpers which were used for conveying mortars are loaded manually and the machines are idle, during the period of loading which is over half an hour at a time. This operation is therefore inefficient and uneconomical. It would, however, seem that introduction of a little more mechanisation would improve the efficiency and the output of labour.

(9) The average daily progress of rubble masonry will have to be pushed up so as to attain the target.

(10) It is desirable that only broad classifications in respect of schedule of rates should be made such that there can be no doubt regarding the correct classification to avoid dispute.

URGENT CANAL WORKS NEEDING ATTENTION.

(1) Tunnel in Mile 52 of the Right Bank Channel speedy construction of this tunnel has become a matter of cruicial importance. Major portion of irrigation included in the Project is in the command of Malebennur and Dhavangere Branches which take off from the Right Bank Channel beyond the tunnel. Hence unless the tunnel is completed expeditiously the development of irrigation will be seriously throttled. The investment in the tunnel machinery can be reduced by Rs.10 lakhs.

(2) The team felt that the major bottle neck is with regard to the decision to be taken up for the Davangere Branch

Channel to cross the Shantisagar Valley, as there has been difference of opinion between the S.T.A.C. members. It is believed that the final agreed solution will be the most economical one, resulting in the saving of the order of Rs.20 to 54 lakhs over the other alternatives.

WATER RATES AND CONTRIBUTION.

(1) The Committee felt that from judging from the water rates for perennial crops that are prevalent in the Bombay State, there seems to be scope for an upward revision of water rates on this project.

(2) It was also felt that the irrigation management should rest with the Irrigation Department as in the case of Bombay, Punjab and some other States.

In general, the team were of the opinion that the set up and the execution of the project was founded on sound lines. They have appreciated the works being carried out departmentally, as this has not only resulted in the work of a good quality at economical rate, but has afforded a high degree of construction experience to the Project Engineers. It was their opinion that this project deserves to be assured of timely and adequate grants to enable its completion within the target date.

K.B. Meerappa 13.11.57

for Secretary to Government,
Public Works Department.

Sml.12.

13-11-57

K.B. MURARAPPA, B.E.,
Under Secretary to Government,
Public Works Department.

Mysore Government Secretariat,
Vidhana Soudha,
Bangalore, dated, 23 Nov. 1957.

DO No.PWD 7 - 8204

Dear Sir,

Sub:-Final report of the Planning Commission Team, Government of India, regarding Lakkavalli Project.

In continuation of my talk over phone to-day regarding the above subject, Iam desired to state that the final views of this Government will have to be communicated to the leader of the Team within 8 or 10 days at the latest. I am, therefore, to state that the matter may kindly be discussed by the Chief Engineer, Major Irrigation (South) with the Secretary to Government, Public Works Department at an early date.

Yours sincerely,

KL 23/11/57

(K.B. Murarappa).

To

G.Krishnaswamy, B.E.,
Deputy Chief Engineer,
Major Irrigation (South),
BANGALORE.

K.B.MURARAPPA, B.E.,
Under Secretary to Government,
Public Works Department.

Mysore Government Secretariat,
Vidhanasoudha,
Bangalore, dated 28 Novr. 1957.

D.O.No.PWD(4)-820

Dear Sir,

Sub: Final report of the Planning Commission Team, Govt. of India, regarding Lakkavalli Project.

====

In continuation of my talk over phone to-day regarding the above subject, I am desired to state that the final views of this Government will have to be communicated to the leader of the Team ~~not within later than~~ 8 or 10 days at the latest. ~~Therefore~~, I am, therefore, to state that the matter may kindly be discussed ~~with the Secretary, Public Works,~~ by the Chief Engineer (MI) with the Secretary ~~if necessary, and finalise the matter~~ at an early date, ~~so that it can be finalised~~

Yours sincerely,

23/11/57

To

G.Krishnaswamy, B.E.,
Deputy Chief Engineer,
Major Irrigation (South),
B a n g a l o r e.

Dear Sri. Gadgil,

I am in receipt of the final report on the Lakkavalli Project, dealt with your D.O. letter No. COPP/I&P/P2/13 dated 18.11.57. (*) But, however, the individual points raised and the suggestions made in the report, are being examined in detail, ~~by this Govt.~~, in consultation with the chief Engineer (Major Irrigation Scheme), of the State. The statements ~~sent~~ sent with your letter cited above, indicating the points on which agreement has been reached with the State Govt., will be forwarded ~~to you~~ as early as possible, after ~~they are examined~~ the views of the CE(MIS) are received, and examined by the Govt.

As I have already stated in my previous letter, Mr. Govt. agree, in general, with the views contained in the report.

With my renewed thanks and kind regards,

Yours sincerely,

(HKV)

GOVERNMENT OF MYSORE

No. PWD 68 BRP 57

Mysore Government Secretariat,

Dated, Bangalore. 195

FROM

The Secretary to the Government of Mysore,
Public Works Department, Bangalore.

To

The Chief Engineer,
Major Irrigation (South),
Bangalore.

Sir,

Sub:-Organisation of investigation into Irrigation and Power Projects by the Committee on plan Projects - Enquiries by the Teams Constituted by the Committee on Plan Projects:-

Ref:-Government's letters. (1) PWD 68 BRP 57 dated 20-2-1957 (2) PWD 68 BRP 57 dated 28-3-1957.

In continuation of the letters cited, I am directed to forward herewith a copy of letter No. 32 (1)/56-Policy dated 25th March 1957 along with a copy of its enclosure received from the Secretary to Government of India, Ministry of Irrigation & Power regarding the above subject and to request you kindly to supply to the Members of the team prompt such information and data, as they may consider relevant to their enquiries.

Yours faithfully,

Sd/-

(K. Murarappa),
for Secretary Government, P.W.D.

PTO

Copy of the above along with copies of its enclosures to the Superintending Engineer, Hxfx, T.V.C., for information and needful.

K.A. Murray 2.4.5

for Secretary to Government,
Public Works Department.

P/o/c

Copy of letter No. 32 (1)/56-Policy dated 25th March 1957 from the Secy. to Govt. of India, Ministry of Irrigation and Power to the Secy. to the Govt. of Mysore, Bangalore.

Sub:- Enquiries by the Teams constituted by the Committee on Plan Projects.

I am directed to invite your attention to the terms of reference of the Teams that have been constituted by the Committee on Plan Projects for the study of the Chambal and Lakkavalli Projects under the Leadership of Shri N.V.Gadgil. One of the objectives of organising the Teams was to make available to the two projects the experience gained on analogous problems in other projects. It will be necessary for the Team, therefore, to obtain comparative data from some of the important projects that have been or are in the process of being completed in different States. The projects from which such data may have to be gathered are indicated in the margin. The names of the Members of the Team and their present addresses are mentioned below:

1. Hirakud.
2. Bhakra Nangal
3. Damodar Valley Corporation.
4. Rihand Dam.
5. Tungabhadra
6. Nagarjunasagar.

1. Shri.M.Narasimhaiya, Chief Engineer (Retd), C/o Chief Engineer, Chambal Project, Chambal Hydel Works, P.O. Madhya Pradesh.
2. Shri.C.L.Handa, I.S.E., 73-74, Sundarnagar, New Delhi.
3. Shri.G.N. Pandit, I.S.E., Circuit House, Shimoga (Mysore).

2. It is not proposed to set up a large scale organisation to assist the Teams in their studies as the intention is that any assistance they may need in connection with their studies should be obtained either from the Project authorities or from such other specialised agencies as have already been constituted at the Centre and in the States. The work to be done by the Members of the Team will also encompass different aspects of designing, planning and construction and it is not likely that the assistance provided by attaching one or two engineers, however experienced, to the Team would be diversified enough for the allotted tasks. As the Committee on Plan Projects is an organisation under the auspices of the National Development Council, it is appropriate that both the Centre and the States should render such assistance as they can to the Teams constituted by it. It is possible that the Members of the Team may have to refer some specialised problems for solution to agencies which are mentioned in the margin. I shall be grateful if you

PTO

1. Central Water and Power Research Station, Poona.
2. Irrigation & Power Research Institute, Amritsar.
3. Hirakud Research Station, Sambalpur.
4. U.P.Irrigation Research Institute, Roorkee.

can kindly request the authorities in charge of the projects/research stations to supply to the Members of the Team promptly such information and data as they may consider relevant to their enquiries.

Shri.S. Venkataraman, Deputy Secretary in this Ministry, has been nominated for liaison work in this connection and may be contacted whenever necessary. On their part, the Members of the Team will invoke the arrangements suggested above only in exceptional circumstances, i.e., when the task is manifestly beyond the control of the staff and equipment made available to them. The head of the project or ~~ng~~ of the agency whose assistance is sought will be consulted before hand in such cases.

5. The cooperation of the Government of Punjab etc. in the matter will be appreciated.

~~Yours faithfully~~,

"~~Copy~~".

for Secretary to Government, 24/5
Public Works Department.

COMMITTEE ON PLAN PROJECTS.

Terms of Reference of the Team for the study of Chambal and Lakkabali (Bhadra) Irrigation Projects.

The Terms of Reference of the Team willbe as follows:

(1) To study all aspects of the Project having a bearing on economy and efficiency with special reference to:

a) Utilisation of trained personnel and materials;

b) Utilisation of machinery and equipment;

c) Construction Plant lay-out;

d) Adequacy of original estimates and designs as evidenced from actual construction of the project;

e) Phasing of construction with a view to studying whether

i) timely utilisation of benefits accruing from the Project has been ensured.

ii) it is possible to accelerate accural of benefits;

iii) benefits could be increased by rephasing the project at this stage;

f) Sufficiency of investigations conducted at the planning stage with a view to the formulation of Project Estimates;

g) The effect of the above study on the financial results of the Project, if any.

(2) Generally to assess the progress made in construction, the reasons for shortfall , if any, and to suggest measures for improvements in the future.

(3) To examine the possibility of decreasing dependence upon imported materials and equipment required for the project.

(4) To examine whether adequate steps have been taken by the authorities concerned for fixing and realising the contemplated water rates, betterment fees and/or any other rates, cesses or taxes.

(5) Any other recommendation that the team may like to make in order to ensure economy and efficiency in the construction of the project.

"Copy"

for Secretary to Government,
Public Works Department.

M.Narasimhaiya.

Chief Engineer & Member,
Irrigation & Power Team,
Committee on Plan Projects,
Planning Commission,

Camp at : Bangalore 4.
Dt. 19/8/1957.

Dear Shri. Sri Kanlaiya

In continuation of my D.O.No. 318/C/CE/M dated 14/8/57 to Shri. D.K.Shrinivasachar, I wish to enclose herewith, for your kind information a copy of the draft report on Lakkavali Project.

A copy of my D.O.letter to Shri. Shrinivasachar is also enclosed.

Yours Sincerely

M. Narasimhaiya

(M.Narasimhaiya)

Shri. B.S.Shrikanthaiya,
Secretary to Government,
Public Works and Elec. Departments,
Mysore State,
Bangalore.

H. K. VEERANNA GOWDH,
Minister for Public Works.

BANGALORE,

Dated. 4th ... Dec. ... 1957.

MPW.
Encl: Statement.

Dear Shri Gadgil,

Kindly refer to your D.O. No.COPP/I&P/82/57, dated 18th November 1957 about the Report of your Team on Bhadra Project. I am enclosing the statement received with Shri Borker's letter duly filled in.

With best regards,

Yours sincerely,

Shri N.V.Gadgil,
Leader,
Irrigation & Power Team,
Committee on Plan Projects,
Multi-storeyed Building,
(5th Floor, 'H' Wing),
Queen Victoria Road,
N E W D E L H I.

Dear Sri. Gadgil,

Re: Draft Report on Lankavalli Project.

I hope you are in receipt of my previous D.O. letter no MPW 750 dated 4.9.'57, regarding the above subject.

One of the most urgent works that need immediate attention of this Govt, as pointed out by the team, is the execution of the two and a half mile long tunnel for taking the Right Bank channel across a range of hills. Major portion of irrigation included in the project is in the command of the Malabanur and Davangere branches, which take off from the Right Bank channel, beyond the tunnel. Hence, unless the tunnel is completed expeditiously, the development of irrigation under the Bhadra project will get seriously affected. ~~Here~~ As opined by the team, speedy execution of this tunnel has, therefore, become a matter of ~~crucial~~ urgent importance.

This Govt., after considering all the aspects, have decided that the execution of the tunnel works, must be done departmentally. The total cost of the machinery and equipment which are required for this purpose is estimated to be about Rs.39 lakhs. ~~With the present difficulties in securing foreign exchange and also with a view to conserving, in the national interest,~~ In order to secure such equipment as may be available in the country, a team of Engineers was deputed to Bhakra-Nangal Project for selecting ~~whatever equipment that was~~ our requirements from ~~Thake~~ equipment available there and surplus to that project, ~~which are required by us for the execution of the tunnel works.~~ Necessary firm orders for the release of such of the machinery that are required by us, have also been placed with the Bhakra-Nangal authorities. But, we still require ~~balance of~~ more machinery for the execution of the tunnel works and

the statement of such balance machinery is enclosed herewith. The total cost of this machinery is about Rs 21 lakhs and the release of foreign exchange to this extent, which is the absolute minimum, has become inevitable.

This Govt. have also proposed to step up the tempo of work on Bhakra Project, so as to complete it by 1960-61, i.e., within the end of the Second plan period. A statement of expenditure programme proposed during the remaining part of the Second plan period is enclosed herewith for your perusal. From the statement, it can be seen that an outlay of Rs 300 lakhs is expected to be spent during the current year, and Rs 448.13 lakhs, Rs 400 lakhs and Rs 250.00 lakhs, during the subsequent three years of the Second plan period, respectively. Hence, this Govt. requires sanction of additional grants ~~to be sanctioned~~ by the centre for stepping up the tempo of work as per this programme.

I therefore, request you kindly to use your good offices for the release of foreign exchange to the extent of Rs 21 lakhs required by us for the purchase of machinery ~~from outside India for the purchase of balance machinery~~ for the execution of tunnel works and also to the grant of additional assistance from the centre so as to enable this Govt. to complete this project within the end of the Second plan period, as per the proposed programme.

With kind regards,

Sri. N.V. Gadgil
Leader of the trip & pur Team,
Committee on plan projects
Planning Commission,
Govt of India
New Delhi.

Copy to CE (MIS) for [illegible]

D.O.No. 318/C/CE/MN

Planning Commission,
Committee on Plan Projects,
Irrigation and Power Team,
Multistoreyed Buildings,
Queen Victoria Road,
New Delhi,
Dt. 14/8/57.

Dear Shri. Shrinivasachar,

The Team for Irrigation and Power of the Planning Commission have prepared their report on the Lakkavali Project. Shri. N.V. Gadgil, Leader of the Team has desired that the Members of the Team should discuss the report with the Mysore Government, before finalising.

Copies of the draft report will be sent to you on my arrival at Bangalore on 18th inst.

I would be very ~~grateful~~ grateful if you kindly spare some time for discussions with me at Bangalore on the 21st August 1957. It is probable that Shri. G.N.Pandit will also be with me. We propose to call on the Minister, P.W.D. and the Chief Minister, thereafter.

Yours sincerely,
Sd/-
(M.Narasimhaiya)

Shri. D.K.Shrinivasachar, I.A.S.,
Secretary to Government,
Public Works Department,
Mysore State,
Bangalore.

Dear Shri Gadgil,

I am in receipt of the final report on the Lakkavalli Project, sent with your D.O. letter No.COPP/I&P/82/57, dated 18-11-57. As I have already stated in my previous letter, this Govt. agree, in general, with the views contained in the report. ~~But, however~~, The ~~individual~~ specific points raised and the suggestions made in the report, are being examined in detail, in consultation with the Chief Engineer Major Irrigation (South) of ~~the~~ State. The statements sent with your letter cited above, indicating the points on which agreement has been reached with the State Govt., will be forwarded to you as early as possible, after the views of the Chief Engineer, M.I.(S) are received, ~~and examined by the Government~~.

With my renewed thanks and kind regards,

Yours sincerely,

(H.K.V.)

To

Shri N.V.Gadgil,
Leader of the Irrgn. & Power Team,
Committee on Plan Projects,
Planning Commission,
Govt. of India, NEW DELHI. 1.

As in some cases we may wish to write with our point of view separately.

This letter is placed before I have today. Tuesday I have approved the draft on 26-11-57 & it could have been despatched even for by Com P. The official responsible for this neglect of duty may be dealt with & reported.

This may be redrafted as the statements are now ready

H. K. VEERANNA GOWDH
Minister for Public Works.

BANGALORE,
Dated. 4th... Dec.... *1957.*

MPW.

Dear Shri Gadgil,

I am in receipt of the final report on the Lakkavalli Project, sent with your D.O. letter No.COPP/I&P/82/57, dated 18-11-1957. As I have already stated in my previous letter, this Government agree in general with the Team in regard to the views contained in the report. The specific points raised and the suggestions made in the report, are being examined in detail, in consultation with the Chief Engineer, Major Irrigation (South) of the State as in some cases we may wish to indicate our point of view specifically. The statements sent with your letter cited above, indicating the points on which agreement has been reached with the State Government will be forwarded to you as early as possible, after the views of the Chief Engineer, Major Irrigation (South) are received.

With my renewed thanks and kind regards,

Yours sincerely,

H K Veeranna Gowdh

To

Shri N.V.Gadgil,
Leader of the Irrigation & Power Team,
Committee on Plan Projects,
Planning Commission,
Government of India,
NEW DELHI.

Dear Shri.Gadgil,

Kindly refer to your D.O.No.COPP/I&P/82/57 dated 18th November 1957 about the Report of your Team on Bhadra Project. I am enclosing the statement received with Shri.Borker's letter duly filled in.

with best regards,

Yours sincerely,

(MINISTER FOR P. W.)

Shri.N.V.Gadgil,
Leader, Irrigation & Power Team,
Committee on Plan Projects,
Multi-storeyed Building,
(5th Floor, 'H' Wing)
Queen Victoria Road,
New Delhi

H. K. VEERANNA GOWDH,
Minister for Public Works.

GOVERNMENT OF MYSORE

BANGALORE,

Dated. 4th...Dec....195 7.

MPW.
Encl: Statement.

Dear Shri Gadgil,

Kindly refer to your D.O. No.COPP/I&P/82/57, dated 18th November 1957 about the Report of your Team on Bhadra Project. I am enclosing the statement received with Shri Borker's letter duly filled in.

With best regards,

Yours sincerely,

H.K. Veeranna Gowda

This may be redrafted suitably

Shri N.V.Gadgil,
Leader,
Irrigation & Power Team,
Committee on Plan Projects,
Multi-storeyed Building,
(5th Floor, 'H' Wing),
Queen Victoria Road,
NEW DELHI.